

**BONUS
ISSUE!**

Dan Gookin Untangles DOS from Windows...20

DOS RESOURCE GUIDE

The PC Productivity Magazine

JULY 1994, #16 \$4.95
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2nd Annual

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- **WHAT THEY DO**
- **HOW THEY WORK**
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REVIVE YOUR DRIVE:

Patch Damaged Data Fast
with SCANDISK...pg 28

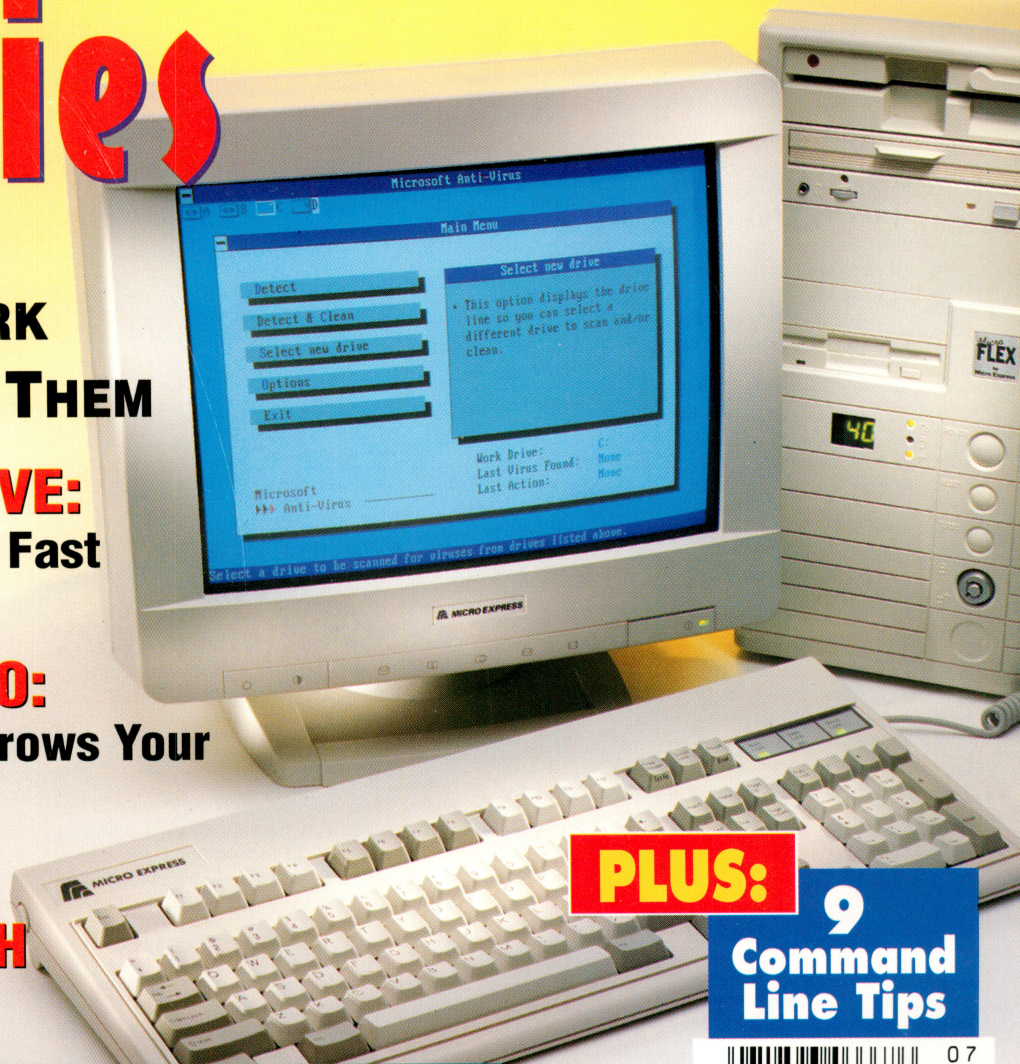
RESCUE LOST INFO:

3 Ways UNDELETE Throws Your
Files A Lifeline...pg 24

**TRIM BLOATED
BATCH FILES WITH
FOR-IN-DO...pg 36**

FREE PROGRAM

Do-It-Yourself Menu-Maker ...pg 40



PLUS:

9

**Command
Line Tips**



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NEAT TRICK: Rob Hummel tells you how to swap keys in ANY program...32

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PRINTED IN THE U.S.A.**EDITORIAL**

Life After Death

by Michael J. Comendul

For a market so lean we're told it's starving, the DOS world is on a binge, gorging on the three software food groups: upgrades, revisions, and renewed corporate commitment. IBM, Novell, and Microsoft continue to revitalize the DOS market, long after the soothsayers and financial analysts of the computer marketplace have seen its body bagged.

In April Microsoft reluctantly re-released MS-DOS without data compression—easily the chief asset of the earlier 6.0 version. After losing a lawsuit (and a \$125 million judgment) to Stac Electronics for cribbing its product's main squeeze, Microsoft removed DoubleSpace from DOS. Microsoft chairman Bill Gates said at the time that a new compression utility would be on the streets by June, compatible with what has become an industry standard—Stacker.

Microsoft resorted to packing into its MS-DOS 6.21 upgrade package a coupon good for a copy of the new utility. Though no word is available on when Microsoft might incorporate such a compression utility into MS-DOS, even a circus gypsy with a marked deck could turn up the cards for another single-user version of the operating system—if only to satisfy Bill Gates's technological pride. And I'm not talking about the skimpy “also ran” package rumored to be shipping with the next version of Windows.

Did I imply Microsoft called Stacker a standard? Not a likely admission from that company. But IBM admitted it, when it licensed Stacker for inclusion in OS/2 and future PC DOS versions. IBM is putting a positive spin on this event, yet since its newly released PC DOS 6.3 contains Superstor compression—a program IBM purchased from AddStor Inc.—it seems likely that IBM is trying to dodge the same lawsuit that stopped Microsoft. After all, most of the current offerings in data compression are based on similar technology. But let me emphasize: What the relationship between Stac and IBM means to you and me is another version of PC DOS from IBM.

And if we need still more evidence of the DOS world's vitality, even a seer with a cracked crystal ball could divine it from the proposed merger of Novell and WordPerfect.

A Novell alliance with WordPerfect isn't as strange as some prognosticators have made it sound. Novell's commitment to the DOS market couldn't be stronger. Not only is Novell peddling a competitive operating system, Novell DOS 7, but its network product, NetWare, is nearly synonymous with DOS. In fact, you might argue that with Novell's strong ties to the American corporation, NetWare is the highest hurdle Windows will have to surmount as Microsoft tries to sweep the business market.

Without question, the world of DOS is proving tough to eradicate. Saying so gives me a somewhat less-than-clever way of explaining a cover test *DOS Resource Guide* is mounting. Over the last few issues in some parts of the country, you may have picked up a copy of *DOS World* and found to your confusion that its cover was wrapped around an issue of *DOS Resource Guide*. We're testing a name change, as many magazines do. The theory is that *DOS World* might reflect our goals as a magazine more adequately. It's just a theory, and I'll let you know whether magazine buyers agree. ■

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SPECIAL ISSUE #3

From the Editors of *DOS RESOURCE GUIDE* !

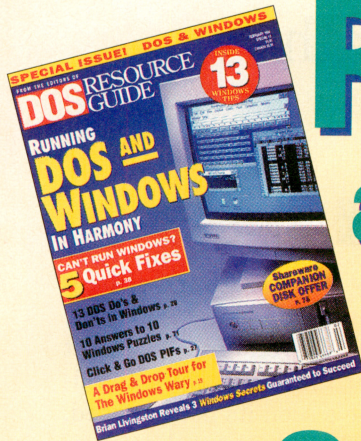
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DOS

24 The Three Faces of UNDELETE by Hardin Brothers

While undeletion utilities have been around for a long time, MS-DOS's UNDELETE, introduced in DOS 5 (and swapped for Central Point's UNDELETE in DOS 6.x), does a fine job of rebuilding your data. Here are a few tips for getting the most from UNDELETE and its companion program, MIRROR.

28 ScanDisk Repairs Hard Drive Data by Doug Lowe

MS-DOS 6.2 users might find it hard to switch from CHKDSK to ScanDisk. But this potent hard drive repair tool goes beyond CHKDSK's abilities, analyzing storage media and improving disk and data safety. And it is an essential companion to those using Microsoft's now defunct DoubleSpace compression utility.

32 How to Customize Your Keyboard by Robert L. Hummel

Frustrated with the layout of your keyboard? It's easy to have it your way. With these latest additions to your PC Toolbox, you can use Debug to reroute your Ctrl key, redefine a key's assignment, or swap two key functions.

BAT

36 What FOR-IN-DO Can Do for You by Hardin Brothers

Get more power out of a single batch-file line than you ever thought possible with FOR-IN-DO. However, eliminating dozens (or hundreds) of separate commands is only one of this misunderstood command's many charms.

BAS

40 Menus à la Carte by John Wolfskill

You can spend a lot for a menuing program, but it's not necessary. Our QBasic program MENU.BAS does the work for you, creating colorful, customizable menus effortlessly. The secret: It generates a batch file for each entry.

FYI

48 2nd Annual Guide to Utility Software

Our second annual guide to over 300 handy programs that take up where DOS leaves off. You'll find every kind of utility here, explained and organized for easy reference.

DRG

C O L U M N S

- 1 Editorial by Michael J. Comendul
DOS has a life of its own.
- 15 Reader Forum by Hardin Brothers
More mysteries to unravel.
- 20 Gookin on DOS by Dan Gookin
How to run your DOS programs under Windows, even if Windows would prefer you didn't.
- 96 Shareware Exchange by Hardin Brothers
Great, ho-hum, or yuck? You decide.

D E P A R T M E N T S

- 4 Letters to the Editor
- 7 Tips from Readers
- 11 Best of the Batch

TIPS

D O S

- 9 Hold Onto Your DOSKEY Macros by Doug Lowe
- 14 The Right Way to Use IF ERRORLEVEL by Doug Lowe
- 18 Is It or Isn't It a DoubleSpace Disk? by Doug Lowe
- 23 Keeping It Legal by Doug Lowe
- 27 Don't Reformat That Disk! by Doug Lowe
- 31 Be More Efficient by Lane Olinghouse
- 35 All the Write Stuff by Doug Lowe
- 78 A More Readable PATH by Doug Lowe

Q B A S I C

- 26 Getting Back to DOS from QBasic by Lane Olinghouse

On the Cover

Pictured on the cover is the Micro Express MicroFLEX-PCI/VL/100, in its mini-tower configuration. This DX4-100 MHz personal computer is unique in that it features both PCI and VESA local bus technology on the same motherboard. Cover photo by Larry Dunn.

How to Contact The Editors

DOS Resource Guide welcomes letters, complaints, and submissions from readers. The easiest way to reach the editors is the U.S. mail: DOS Resource Guide, 80 Elm St., Peterborough, NH 03458. All letters to the editor and questions are understood to be submitted for publication unless otherwise indicated. You can reach our staff electronically over CompuServe at 75300,2361. Please include your complete address and a daytime phone number on your correspondence.

Also, you can reach the editors through the DRG bulletin board system (603-924-3181). To connect, set your modem and software to 8 data bits, no parity, and 1 stop bit. DRG's BBS lists all of the QBasic and shareware programs mentioned in these pages. Shareware listed on the DRG BBS are products protected by copyright law. You are welcome to try these programs. If you find them useful, you are asked to register and pay the applicable fees to the programs' respective owners.

DRG encourages the submission of DOS tips, QBasic programs, and batch-file articles from readers. Please submit all material on disk in ASCII format together with a double-spaced printed copy to our offices. The magazine cannot be responsible for the return of these manuscripts, unless an appropriate mailer and return postage are enclosed.

DRG makes every effort to verify its articles and programs, but the magazine assumes no responsibility for any damages because of errors or omissions in our articles. Corrections to listings or articles are printed as soon as possible.

Letters to the Editor

The Last Laugh

You should have heard me laughing when I first picked up your magazine (*DRG*#12). After all, who on earth actually uses DOS? I almost walked away from it, but then I noticed the issue included a free QBasic program that I thought was well worth the asking price, \$6.50 (Canadian).

Later, at the gift shop where I work, I flipped through the rest of the magazine while killing time between customers. I was impressed, especially with the articles about DOS upgrades and disk optimiza-

tion. Needless to say, I bought a copy of *DRG*#13.

Thanks for a good chuckle and an education on what can be done with DOS.

Cynthia Way
Halifax, Nova Scotia

No Pain, All Gain

I recently built a 33MHz 486DX tower system. I started off using MS-DOS 6.2's memory-management options, but I found that my base memory wasn't sufficient to run certain programs and games. I

constantly had to alter my AUTO-EXEC.BAT by adding REM statements to free more memory. I also experienced lockups while in Windows.

After reading the comparison of DOS utilities and their third-party counterparts in "Remember the Little People" [*DRG* #11, page 59], I switched from DoubleSpace to Stac Electronics' Stacker 3.1 and from MemMaker to Qualitas' 386MAX 7.0. Wow! I gained more than 30K of memory and haven't had lockups or run out of memory.

Keep up the comparisons and suggestions. I think *DRG* is a great magazine.

Raymond J. Spelas
Heidelberg, Germany

OMISSIONS AND CORRECTIONS

Regrettably, there is an error in the program listing for KEYID.SCR in *DRG*#15's "PC Toolbox" (page 33) by Robert Hummel. In fact, there are three. The problem can be corrected by adjusting line 19 (beginning CMP), line 21 (XOR), and line 25 (CMP). The ES: should be removed from each line and placed on a line of its own preceding each of the offending lines. For example:

```
ES:
CMP AL, [417]
```

In an earlier issue, we left out the spaces that should appear immediately after the command ATTRIB in the first entry for "Tips from Readers" (*DRG*#14, page 9). In other words, the listings should read ATTRIB +R and ATTRIB -R, and not ATTRIB+R and ATTRIB-R.

In the Tool Kit section of our

Maximum DOS Special Issue (June 1994), we omitted proper credit for the article titled "A Quick Trip Home," and its accompanying batch file, RETURN.BAT (page 56). The article and Companion Disk files are excerpted from chapter 8 of the book *Dr. Batch File's Ultimate Collection*, by Ronny Richardson (Windcrest/McGraw-Hill, 1993), with permission of the publisher.

Finally, an incorrect phone number appeared in "If It Ain't Broke...Don't Fix It" (Start-Up Clinic, *DRG*#13, page 63). For information on the ALL ChargeCard memory-expander board, call 216-564-7875. To order an ALL ChargeCard, call 800-386-2486. Our apologies to the Ohio doughnut shop that fielded calls from *DRG* readers hungry for something other than pastry.

—Eds.

Consider Yourselves Lucky

I would like to say thank you for producing such a comprehensive magazine on DOS functions. Being a computer novice, I was understandably intimidated by DOS and its complex requirements. Your magazine helps eliminate much of my fear and loathing of DOS.

However, I take exception to those who refer to me, and others like me, as Windows weenies. I find that Windows applications offer a great deal of productivity. In addition, I think that you and your readers should thank your lucky stars for Windows. It has brought a user-friendly environment to the masses, and the resulting acceleration of sales has brought down the cost of computers and associated hardware and software.

Bill Himes
Palm Bay, Fla.



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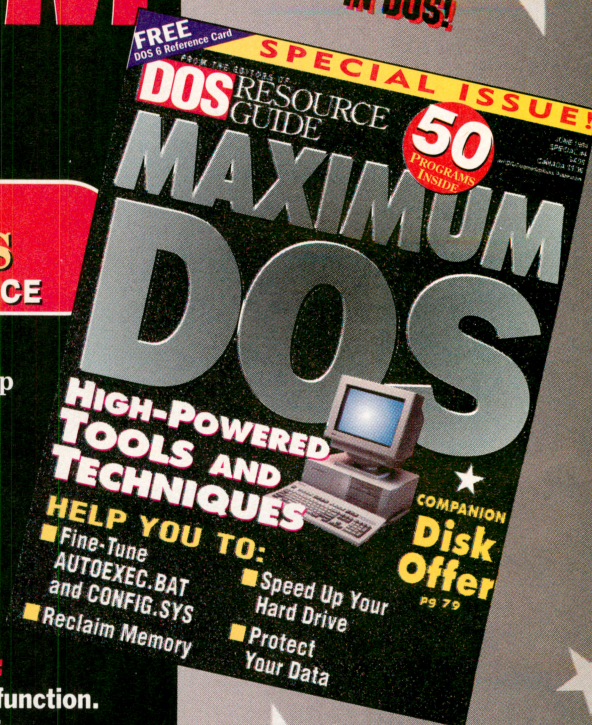
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Tips from Readers

Automate Daily Duties

I've written a short batch file called `ONCE.BAT`, which you can invoke in your `AUTOEXEC.BAT` to perform a given task on the first bootup of each day. You can use it to initiate a daily virus scan, hard disk diagnostics, and the like.

As written, `ONCE.BAT` requires DOS 5 or later, but you can modify the program to work under earlier DOS versions. The program won't, however, work with alternative command interpreters, such as `NDOS` from Symantec's *The Norton Utilities*.

*Allen Burdic
Myrtle Creek, Ore.*

Keeping Start-Up Files Accessible

Like James L. Kelly ["Tips from Readers," *DRG*#14, page 9], I protect my `CONFIG.SYS` and `AUTOEXEC.BAT` files from accidental deletion by setting their read-only attributes. But I also want to be able to call them up quickly, remove the read-only restriction, edit the files, and restore read-only protection.

To do this, I added two `DOSKEY` macros to the `MACROS.BAT` batch file I invoke in my `AUTOEXEC.BAT`. The command for `CONFIG.SYS` is:

```
DOSKEY ECON=ATTRIB -R CONFIG.SYS
$T EDIT CONFIG.SYS $T ATTRIB +R
CONFIG.SYS
```

The command for `AUTOEXEC.BAT` is similar:

```
DOSKEY EAUT=ATTRIB -R AUTOEXEC.BAT
$T EDIT AUTOEXEC.BAT $T ATTRIB
+R AUTOEXEC.BAT
```

Because I often need to look at the current versions of my start-up files and I don't like typing long commands day after day, I also added these two macros to `MACROS.BAT`:

```
DOSKEY CON=TYPE CONFIG.SYS $B MORE
$T PAUSE
DOSKEY AUTO=TYPE AUTOEXEC.BAT $B
MORE $T PAUSE
```

The first one lets me look at `CONFIG.SYS` page by page simply by typing `CON`. The second allows me to type `AUTO` to scroll through `AU-`

`TOEXEC.BAT` one screen at a time.

*Robert de Vlam
Ouderkerk-Amstel, Netherlands*

Food for Thought

A couple of things that I read in *DRG*#13 have prompted me to write. When I saw the tip "The Time Has Come" [page 19], I realized that I could display both the time and date handily using a different approach from David Oatley's. I created two batch files in a directory listed in my `AUTOEXEC.BAT`'s `PATH` statement. Because they're so short, I wrote them right at the DOS prompt.

The first program, `CR.BAT`, contains only a carriage return. Here's how I created it:

```
COPY CON CR.BAT
^M
^Z
```

(You create the carriage-return character `^M` by holding down the `Ctrl` key and pressing the `M` key; pressing `Ctrl-Z` or `F6` produces the end-of-file marker `^Z`.)

To create the second batch file, `TIM.BAT`, I typed:

```
COPY CON TIM.BAT
TIME <CR.BAT
DATE <CR.BAT
^Z
```

Now, when I want to know the time and date, I type `TIM` at the DOS prompt. Redirecting the output from `CR.BAT`—a carriage return—to `TIME` and `DATE` saves me from having to press `Enter` twice: once to accept the time and once to accept the date.

ONCE.BAT lets you automatically perform a given task the first time you boot up each day. Simply replace the `ECHO` command in the fifth line with the command you want executed, then invoke `ONCE.BAT` in `AUTOEXEC.BAT`.

```
@ECHO OFF
ECHO. | DATE > NOW.DAT
ECHO N | FC NOW.DAT TST.DAT | FIND "no" > NUL
IF NOT ERRORLEVEL 1 GOTO STOP
IF ERRORLEVEL 1 ECHO Place task to perform once a day here.
COPY NOW.DAT TST.DAT > NUL
GOTO END
:STOP
ECHO Same day. No need for action.
:END
```

End

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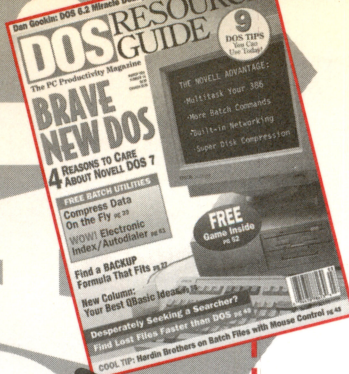
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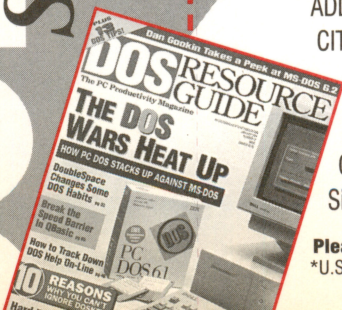
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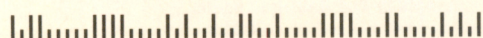
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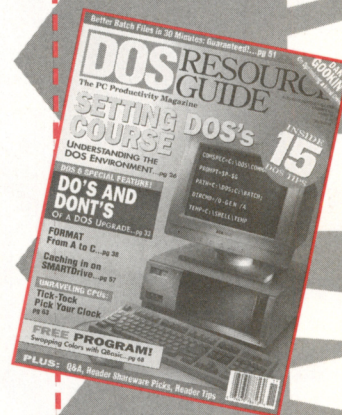
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YES! SAVE ME MONEY

COPIE.BAT makes it easy to create backup copies of all files in the current directory.

```
@ECHO OFF
IF %1==A GOTO A_DISK
IF %1==B GOTO B_DISK
GOTO END
:A_DISK
COPY *.BAT A:\*.BAK
GOTO END
:B_DISK
COPY *.BAT B:\*.BAK
:END
```

End

After reading "10 Reasons to Load DOSKEY" in the same issue [page 26], I decided to share some of the macros I use to save keystrokes. This one lets me quickly create a new directory and change to it:

```
M=MD $1 $T CD $1
```

This one lets me clear the screen by typing a comma:

```
,=CLS
```

This one tells DOS to display a list of active macros, one screen at a time:

```
H=DOSKEY /M $B MORE
```

*Bob Rhodes
Chagrin Falls, Ohio*

Backups by the Bunch

My batch file COPIE.BAT provides a quick way to back up batch files you've created or altered. It sends a copy of each batch file in the current directory to drive A or drive B; all copies are given the extension BAK.

To use the batch file, type COPIE A to copy files to drive A and COPIE B to send them to drive B. But remember: If a file of the same name already exists on the destination disk, COPIE.BAT overwrites it.

*Lane Olinghouse
Everett, Wash.*

The Power of Suggestions

I have a two observations on DRG#13. On page 9 of "Tips from Readers," Frank Shutts presents a three-line batch file to clear out BAK files and prevent the possibility of a "File not found" message appearing on screen. I'd like to suggest a one-liner that can do this:

```
IF EXIST *.BAK DEL *.BAK>NULL
```

Regarding "10 Reasons to Load DOSKEY" [page 26], I favor using DOSKEY to create a macro for invoking each frequently used command or application [setting up a command such as DOSKEY WP=C:\WP60\WP.BAT to run a word proces-

sor, for example]. This approach has several advantages:

1. Your commands and programs will execute faster than if DOS had to check your PATH statement to find them.
2. You can speed up your system by shortening your PATH statement, perhaps listing only the drives and directories in which seldom-used programs reside.
3. You won't have to concern yourself with thinking up unique batch-file names. Naming a batch file COPY.BAT, for instance, won't cause conflicts with DOS's COPY command.

*Ben Schmitz
Berg en Terblijt, Netherlands*



HOLD ONTO YOUR DOSKEY MACROS

If you go to the trouble of creating a covey of DOSKEY macros from the command line, you'll probably want to use them again later. You can do this easily if you know the rules for saving your macros in a batch file.

First, issue a command such as this one:

```
DOSKEY /MACROS >MACROS.BAT
```

This writes a list of all the current macros to a file called MACROS.BAT. The resulting file might look something like this:

```
RO=ATTRIB +R $
RW=ATTRIB -R $
```

RO and RW are the macro names; the commands to the right of the equal signs are the actions that the macros carry out.

To convert this file into an executable batch file that activates all three macros, edit the file, adding a DOSKEY command to the beginning of each line. Then, insert a DOSKEY command (without any parameters) as the batch file's first line.

MACROS.BAT will then look like this:

```
DOSKEY
DOSKEY RO=ATTRIB +R $
DOSKEY RW=ATTRIB -R $
```

If you store MACROS.BAT in a directory listed in your PATH command, you can run the program by typing MACROS at the DOS prompt. If you want to activate the macros every time you boot up, simply add the command CALL MACROS to your AUTOEXEC.BAT.

—Doug Lowe

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Best of the Batch

All-Purpose Set-up Utility

If you use different computer set-ups at different times, and you haven't yet upgraded to DOS 6.x and its CHOICE command, you may be interested in BOOT.BAT. It lets you keep several versions of your CONFIG.SYS and AUTOEXEC.BAT set-up files on your hard disk and change among them quickly.

BOOT.BAT offers several appealing features. First of all, it's flexible. If your primary boot drive is something other than drive C, or you occasionally need to append lines to your AUTOEXEC.BAT, you can accomplish this with ease. Secondly, the program is friendly. If your hard disk contains one of the widely available warm-reboot programs, BOOT.BAT will reboot automatically after you change your system's configuration.

Another plus is that when something goes wrong, informative error messages pinpoint the source of the problem. In addition, BOOT.BAT is both compression- (Stacker) and cache-aware. If you must have matching copies of your CONFIG.SYS and AUTOEXEC.BAT files on two different drives at bootup, as some versions of Stacker require, the program provides for this. If you use delayed-write disk-caching software, BOOT.BAT permits you to use a batch file to flush the cache. Without this feature, you lose information if the system is rebooted before data is written to disk.

Program Requirements

As written, BOOT.BAT requires DOS 5 and later and takes advantage of DOS's environment space. Most default configurations set aside plen-

ty of memory for this purpose, but you can make sure enough space is available by checking the SHELL command in your CONFIG.SYS file. The /E switch should be set to at least 256 bytes. If you don't find a SHELL command, add the following line to CONFIG.SYS before you use BOOT.BAT:

```
SHELL=C:\DOS\COMMAND.COM /P /E:256
```

(If you store COMMAND.COM in a directory other than C:\DOS, change this line accordingly.)

Although you may run BOOT.BAT

without a warm-reboot utility, you can avoid having to press your system's reset button if you use a program of this type. [The editors have included WARMBOOT.COM with this article; see the sidebar below.]

If you use delayed-write disk-caching software (a program that delays disk writes to reduce the number of disk accesses and thus improve performance), you also should take the precaution of creating a batch file that flushes the cache by writing the information it contains to disk.

The version of SMARTDrive

USING WARMBOOT.COM

WARMBOOT.COM is a Debug utility that resets your computer without your having to turn it off and on. Once the computer reboots itself, your new configuration will be running the computer.

To create WARMBOOT.COM, type in WARMBOOT.SCR using an editor that saves files in ASCII (text) format. Be sure to include the blank line as shown. Then type the following command at the DOS prompt:

```
DEBUG < WARMBOOT.SCR
```

(Remember to supply the correct path if necessary.)

Hardware differences make it impossible to write reboot software that works with all systems, but WARMBOOT.COM should be compatible with most systems. If your computer locks up during rebooting, discontinue using WARMBOOT.COM. You can reboot your system manually when BOOT.BAT tells you, or try another reboot program. The sidebar "Creating

REBOOT.COM" on page 8 of DRG#4 contains an alternative to the program printed here, or you might check the shareware offerings of a reputable BBS or on-line service.

—Eds.

Use the Debug script WARMBOOT.SCR to create the executable program WARMBOOT.COM, which reboots your computer automatically.

```
N WARMBOOT.COM
A 100
MOV AX,40
MOV ES,AX
MOV BX,72
MOV AX,1234
ES:
MOV [BX],AX
JMP FFFF:0

RCX
13
W
Q
```

End

BOOT.BAT is a configuration manager that lets you store different pairs of **CONFIG.SYS** and **AUTOEXEC.BAT** files on your hard disk. When you want to change your system's setup, you invoke **BOOT.BAT** and provide the name of the new system configuration.

```
@ECHO OFF
SET BD1=C:
SET BD2=
SET WKDIR=C:\DOS
SET FLUSH=FLUSH.BAT

IF NOT EXIST %WKDIR%\NUL GOTO CFGERROR
IF NOT EXIST %WKDIR%\CFG\NUL GOTO WKDIRERROR
IF "%1"==" " GOTO SHOWOPTS
IF "%1"==" /?" GOTO SHOWHELP
FOR %%A IN (S s) DO IF "%1"=="%A" GOTO SAVECONFIG
FOR %%A IN (E e) DO IF "%1"=="%A" GOTO KILLCONFIG
IF NOT EXIST %WKDIR%\CFG\%1\NUL GOTO INVALID
IF NOT EXIST %WKDIR%\CFG\%1\READ.ME GOTO NOREADME

:CONTNOREADME
FOR %%A IN (%BD1%\CONFIG.BAK %BD1%\AUTOEXEC.BAK) DO
  IF EXIST %%A GOTO BACKUPS

:CONTBACKUPS
IF EXIST %WKDIR%\CFG\%1\*.BAK GOTO CONFUSED

:CONTCONFUSED
ECHO Configuring for %1
COPY %WKDIR%\CFG\%1\*. * %BD1%\ > NUL
IF NOT "%BD2%"==" " COPY %WKDIR%\CFG\%1\*. * %BD2%\ > NUL

:ADDCOMMAND
IF "%2"==" " GOTO WARMBOOT
ECHO "%2" will be appended to your AUTOEXEC.BAT file.
ECHO %2 >> %BD1%\AUTOEXEC.BAT
IF NOT "%BD2%"==" " ECHO %2 >> %BD2%\AUTOEXEC.BAT
SHIFT
GOTO ADDCOMMAND

:WARMBOOT
IF NOT "%FLUSH%"==" " GOTO FLUSH
:RESUMEWARMBOOT
ECHO Rebooting...
IF EXIST %WKDIR%\CFG\WARMBOOT.COM %WKDIR%\CFG\WARMBOOT
FOR %%A IN (%PATH%) DO IF EXIST %%A\WARMBOOT.COM
  %%A\WARMBOOT.COM
ECHO Waiting...
ECHO Can't find WARMBOOT.COM in the %WKDIR%\CFG
ECHO directory or anywhere along the DOS path.
ECHO Using a program such as this lets you reboot
ECHO your system without pressing the reset button.
ECHO.
ECHO Press Ctrl-Alt-Del now to reboot:
FOR %%A IN (WKDIR BD1 BD2 FLUSH) DO SET %%A=
PAUSE > NUL
GOTO END

:FLUSH
SET FP=
FOR %%A IN (%PATH%) DO IF EXIST %%A\%FLUSH% SET FP=%%A
IF "%FP%"==" " SET FP=%WKDIR%\CFG
IF NOT EXIST %FP%\%FLUSH% GOTO FLUSHERROR
CALL %FP%\%FLUSH%
```

```
SET FP=
GOTO RESUMEWARMBOOT

:FLUSHERROR
ECHO CACHE FLUSH ERROR!
ECHO The batch file that flushes your cache,
ECHO specified in line 5 of this listing as %FLUSH%,
ECHO wasn't found in the work directory (%WKDIR%\CFG)
ECHO or in your DOS path.
ECHO If you don't wish to use a cache-flushing batch
ECHO file, set line 5 of this batch file to read:
ECHO SET FLUSH=
ECHO.
ECHO Press any key to continue the reconfiguration
ECHO process.
PAUSE > NUL
GOTO RESUMEWARMBOOT

:BACKUPS
ECHO BAK files found in the root directory!
ECHO The current CONFIG.SYS or AUTOEXEC.BAT files
ECHO may have been modified!
ECHO The following BAK files have been found in the
ECHO root directory on drive %BD1%
DIR /B /OE /P %BD1%\*.BAK
ECHO Press Ctrl-C now to abort, or any other key
ECHO to proceed.
PAUSE > NUL
GOTO CONTBACKUPS

:CONFUSED
ECHO BAK files found in the configuration area!
ECHO The following BAK files exist in the
ECHO %WKDIR%\CFG\%1 directory:
DIR /B /OE /P %WKDIR%\CFG\%1\*.BAK
ECHO These would be copied to the root directory
ECHO during reconfiguration and may cause confusion
ECHO later. To be safe, these files will now be
ECHO deleted. Press Ctrl-C now to abort, or any other
ECHO key to continue.
PAUSE > NUL
DEL %WKDIR%\CFG\%1\*.BAK > NUL
GOTO CONTCONFUSED

:CFGERROR
ECHO Configuration error.
ECHO The working directory (%WKDIR%) specified in
ECHO line 4 of this batch file doesn't exist.
GOTO END

:WKDIRERROR
CLS
ECHO New installation.
ECHO Welcome to BOOT.BAT, a configuration manager.
ECHO BOOT.BAT will now create a subdirectory under
ECHO the %WKDIR% directory (as specified in line 4 of
ECHO this batch file). This directory will house your
ECHO various configurations.
```



```

ECHO Press Ctrl-C now to abort, or any other key to
ECHO continue.
PAUSE > NUL
MD %WKDIR%\CFG
ECHO Done. Pick a name for your configuration. It may
ECHO contain eight or fewer characters. For example,
ECHO you might use WIN for your Windows
ECHO configuration. Then, type "BOOT S {configname}"
ECHO to save your configuration.
GOTO END

```

```

:INVALID
ECHO Invalid selection.
ECHO Type %0 to see a list of available selections.
GOTO END

```

```

:NOREADME
ECHO READ.ME file is missing.
ECHO The %WKDIR%\CFG\%1 directory exists, but the
ECHO READ.ME file that describes the configuration is
ECHO missing. The program will now create this for
ECHO you. You may modify the file with any ASCII
ECHO editor.
ECHO Configured for %1 > %WKDIR%\CFG\%1\READ.ME
ECHO Done! Press any key to continue...
PAUSE > NUL
GOTO CONTNOREADME

```

```

:SAVECONFIG
IF "%2"==" " GOTO SAVEHELP
IF EXIST %WKDIR%\CFG\%2\NUL GOTO UPDATECONFIG
ECHO Creating new directory...
MD %WKDIR%\CFG\%2
IF NOT EXIST %WKDIR%\CFG\%2\NUL GOTO SAVEERROR
ECHO Configured for %2 > %WKDIR%\CFG\%2\READ.ME

```

```

:UPDATECONFIG
ECHO Saving configuration...
COPY %BD1%\CONFIG.SYS %WKDIR%\CFG\%2\CONFIG.SYS > NUL
COPY %BD1%\AUTOEXEC.BAT %WKDIR%\CFG\%2\AUTOEXEC.BAT >
NUL
GOTO END

```

```

:SAVEERROR
ECHO Error creating directory %2
GOTO END

```

```

:SAVEHELP
ECHO No save directory was specified.
ECHO Please specify the name of the directory in
ECHO which you want to save the configuration.
GOTO END

```

```

:KILLCONFIG
IF "%2"==" " GOTO KILLHELP
IF EXIST %WKDIR%\CFG\%2\NUL GOTO KILLCHECK
ECHO ERROR: Directory %2 doesn't exist.
GOTO END

```

```

:KILLCHECK

```

```

ECHO About to kill the configuration named %2. Press
ECHO Ctrl-C now to abort, or any other key to
ECHO continue.
PAUSE > NUL
ECHO Y|DEL %WKDIR%\CFG\%2 > NUL
RD %WKDIR%\CFG\%2
GOTO END

```

```

:KILLHELP
ECHO You didn't specify the configuration to be
ECHO erased. Please specify the name of the
ECHO configuration to be killed.
GOTO END

```

```

:SHOWHELP
ECHO CONFIGURATION MANAGER v.1.0 by Steve Greenspon
ECHO.
ECHO Syntax: %0 {configname} {command 1} {command
2} {...}
ECHO %0 S {configname}
ECHO %0 E {configname}
ECHO.
ECHO configname = one of the available
ECHO configuration choices. If you omit
ECHO this, the program displays a list of
ECHO choices.
ECHO command = An optional command (such as
ECHO DIR/W or WIN) to be appended to the
ECHO end of your AUTOEXEC.BAT.
ECHO S {configname} = Saves the current
ECHO AUTOEXEC.BAT and CONFIG.SYS files to
ECHO their own configuration area.
ECHO E {configname} = Erases the specified
ECHO configuration.
ECHO.

```

```

IF "%BD2%"==" " SET BD2=NOT REQUIRED
IF "%FLUSH%"==" " SET FLUSH=NOT USED
ECHO Current Settings:
ECHO Working Directory = %WKDIR%
ECHO Boot Drive 1 = %BD1%
ECHO Boot Drive 2 = %BD2%
ECHO Flush Batch File = %FLUSH%
GOTO END

```

```

:SHOWOPTS
ECHO Configuration Options:
DIR /B /ON /AD /P %WKDIR%\CFG\*.*
IF EXIST %BD1%\READ.ME GOTO YESREADME
ECHO WARNING: The READ.ME file that describes what
ECHO the current configuration does is missing from
ECHO the root directory. It may have been
ECHO inadvertently deleted.
GOTO END

```

```

:YESREADME
ECHO Current Configuration:
TYPE %BD1%\READ.ME

```

```

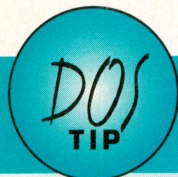
:END
FOR %%A IN (WKDIR BD1 BD2 FLUSH) DO SET %%A=

```

End

that comes with DOS 6.0, for example, is a delayed-write cache. DOS 6.2's SMARTDrive also is a write-back cache, but you may add a /X switch if you wish to disable the caching of writes. If you use SMARTDrive with write caching in effect, you may use this one-line batch file, FLUSH.BAT, to flush the cache:

```
@SMARTDRV /C
```



THE RIGHT WAY TO USE IF ERRORLEVEL

An indispensable batch programming tool, the IF ERRORLEVEL command lets you test for specific error values and use the results of the test to determine what the batch file does next. Unfortunately, it's a tool that many programmers use incorrectly at first.

You can avoid problems if you remember that the IF test is true if the value of the error level is *equal to or greater than* the value for which you test. When you use a command such as the following, for example, the batch file branches to LABELA if ERRORLEVEL is 1 or any value greater than 1:

```
IF ERRORLEVEL 1 GOTO LABELA
```

Naturally, this affects the way you use IF ERRORLEVEL to test for several possible values within a batch file. Suppose, for example, that you use the following CHOICE command to request the user to enter an A, B, or C:

```
CHOICE /C:ABC Enter your choice
```

Suppose that you also want the user's choice to determine whether the batch file then branches to LABELA, LABELB, or LABELC. CHOICE will return an error level of 1 if the user presses A, a value of 2 if the user presses B, and a value of 3 if the user presses C.

Your initial instinct might be to use these three commands to test the error levels:

```
IF ERRORLEVEL 1 GOTO LABELA
IF ERRORLEVEL 2 GOTO LABELB
IF ERRORLEVEL 3 GOTO LABELC
```

If you do this, however, you'll quickly discover that no matter which key the user presses, the batch file branches to LABELA. Why? Because if the value of ERRORLEVEL is greater than or equal to 1, the CHOICE command always sets ERRORLEVEL to 1, 2, or 3, and the first IF command branches to LABELA.

To properly test the results of the above CHOICE command (or any other series of ERRORLEVEL values), you must specify the IF commands in reverse order, starting with the highest error-level value you want to test:

```
IF ERRORLEVEL 3 GOTO LABELC
IF ERRORLEVEL 2 GOTO LABELB
IF ERRORLEVEL 1 GOTO LABELA
```

—Doug Lowe

BOOT.BAT has one final requirement: a READ.ME file for each configuration. The batch file creates these files, but you should modify each one to provide more complete information on what its configuration files do.

Getting Down to Business

BOOT.BAT starts by using SET commands to establish a series of environment variables. If you wish, you

may change these settings. BD1, the variable name for the first boot drive, is set to drive C. BD2, the second boot drive, isn't assigned a variable name. If you use Stacker or another program that requires a second boot drive, you must provide a drive letter in this line.

WKDIR establishes the name of the directory under which the working directory, \CFG, is created. You may store WARMBOOT.COM and FLUSH.BAT in \CFG; BOOT.BAT stores each set of configuration files and each READ.ME file in a separate directory one level below \CFG. (If you prefer to use a directory other than C:\DOS as the parent directory for \CFG, change the fourth line of the program accordingly.)

The final SET command establishes FLUSH.BAT as the name of the batch file to invoke before rebooting.

The BOOT.BAT program recognizes six syntactic variations. To save or update a particular configuration, simply activate the desired set of start-up files and then type `BOOT S configname`. BOOT.BAT saves the current CONFIG.SYS and AUTOEXEC.BAT files under the name you specify. To switch among several pairs of start-up files, you must take the preliminary step of activating each set in turn and assigning it a unique configuration name.

When you need to change your system's configuration, type `BOOT configname`. BOOT.BAT places the appropriate CONFIG.SYS and AUTOEXEC.BAT files in the root directory and then attempts to reboot. Typing `BOOT configname command` not only changes your computer's setup, but also appends the specified command to the end of your AUTOEXEC.BAT. Typing `BOOT E configname` erases the specified set of configuration files.

If you forget what configuration options are available, type `BOOT` to view a list. To see a brief summary of the commands and the current settings, type `BOOT /?`.

Steve Greenspon
Montreal, Quebec

READER FORUM

The Mystery Is Solved

by Hardin Brothers

I love a good mystery, battling wits with a clever author who keeps me in suspense until the last page. I get similar enjoyment writing this column, because all of your questions are mysteries.

Sometimes, I can suggest a solution immediately, because I've faced the same situation myself. Other times, I'm as mystified as you are and must duplicate the problem and then try to find an answer. And occasionally, a mystery is too tough for me to crack on my own, and I have to ask for help.

Most of this month's cases were straightforward. But the final one, which has appeared here twice before, led me on a merry chase. Without the assistance of sharp-eyed readers, I might never have tracked down the guilty party. But that's getting ahead of the story...

The Riddle of the Brownish-Red Screen

The first puzzle comes to us from across the ocean. Reader Robert de Vlam of the Netherlands wants to know why PC screens can display yellow characters but produce a brownish-red color when you try to display a yellow background.

Blame it on the bits and bytes. When the screen is in text mode, as it is at the DOS prompt, every character on the screen is represented by two bytes (16 bits) in the video adapter's RAM. One of those bytes is a character number, the character's ASCII code. The video adapter uses that code to look up the character's shape in a font table. The font table resides in the video adapter's ROM or in a protected part of the adapter's RAM. If you're an experienced program-

mer, you can change the displayed font by changing the RAM shape table.

(If you want to create chaos, you can scramble the shapes in the font table to display different letters for every ASCII code. When I was teaching programming, for example, a student reprogrammed one computer to display every character upside down. I

was ready to call in a repair service until I realized from the student's giggles that he had changed the internal font table.)

But it is the second byte for each character that holds the key to solving Robert's mystery. It stores information on the character's

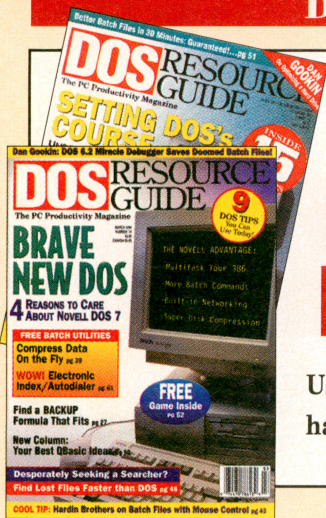
attributes. Three of the eight bits in that byte designate a foreground color; three others designate a background color. This means that eight foreground and eight background colors are available. The seventh bit determines whether the character is bold, and the eighth determines whether it blinks. Notice that no allowance is made for setting the intensity (or "boldness") of the background color—at least not usually.

On most monitors, the color called yellow is displayed as a light brown in normal mode and as a clear yellow in bold mode. To generate a true yellow foreground, you must select a yellow foreground character and also select a bold display. But because you can't select a bold background, you can't generate a true yellow background color. Notice that you may select from a total of 16 foreground colors—eight in normal mode and eight in bold mode—but only eight normal-mode background colors are available.

Luckily, this isn't the end of the story. On most VGA

When a computing problem arises, remember that everything your computer does is affected by everything else it has done since you turned on the power.

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and later adapters, you may "throw" a software switch that changes the meaning of the eighth attribute bit. Usually, that bit selects steady or blinking foreground characters, but you can set the switch so that the eighth bit selects normal or bold background colors. Therein lies the solution to Robert's dilemma. By setting the adapter's switch and then telling the screen to display blinking characters, you can produce bold background colors instead of blinking letters.

To help those of you who favor bold backgrounds (including a true yellow), I created the short Debug script, BLINKOFF.SCR. After typing in the listing with an editor that saves text in ASCII format, save the listing and then type `DEBUG < BLINKOFF.SCR` at the DOS prompt. This creates the executable program BLINKOFF.COM, which turns off blinking and thus enables bold background colors. To turn on blinking, use BLINKON.SCR to create the executable program BLINKON.COM.

For example, you might employ BLINKOFF if you are using ANSI.SYS sequences to set colors from within a batch file. If you want blue characters on a yellow background, use these commands:

```
BLINKOFF
ECHO ← [0;34;43;5m
```

The left facing arrow is the escape character, which you may create in the DOS Edit program by pressing Ctrl-P and then Esc.

The ECHO statement selects the colors: The zero turns off all previous attributes, 34 selects a blue foreground, 43 selects a yellow background, and 5 selects blinking characters (in this case, a bold background). You can see the effect of the blink/bold switch by typing text on the screen and then running BLINKON and BLINKOFF alternately.

Note that BLINKOFF and BLINKON affect the entire screen. If you want to display bold background colors and blinking characters on the same screen, you must generate that effect by reprogramming the color registers on the VGA card, which is a more complex task.

The Curse of the Cryptic DOS Message

If you haven't ever used Debug, perhaps you should read on before trying to create BLINKOFF and BLINKON. Otherwise, you may have the same trouble as Bill Jones of Kouts, Ind., who wonders why he got a "Bad command or file name" message when he issued the following command to create KEYGET.COM from KEYGET.SCR:

```
DEBUG < KEYGET.SCR
```

That error message is DOS's cryptic way of telling you that it can't find a program or file. In this case, it can't find DEBUG.EXE. For the above line to work,

DEBUG.EXE must reside in the current directory or in a directory listed in your PATH statement.

Debug comes with all versions of MS-DOS and most versions of PC DOS, but if your system came loaded with DOS it might not have been copied to your hard disk.

If you have DOS 5 or later, you may conduct a quick search for Debug by changing to the root directory of your hard disk and typing this command:

```
DIR DEBUG /S
```

DOS then searches every directory on your drive for Debug, reporting its location or issuing a "File not found" message. If you locate Debug with the above DIR command, you may eliminate the "Bad command or file name" message by moving Debug into a directory listed in your AUTOEXEC.BAT's PATH statement or by adding the name of Debug's directory to PATH.

If you receive a "File not found" message in response to the DIR command, get out your DOS disks and look for a file called DEBUG.EX_. (In some DOS versions, it's called DEBUG.CO_.) After finding the file, use DOS's EXPAND utility (which should be in your

Use the Debug script BLINKOFF.SCR to create the executable program BLINKOFF.COM, which turns off the blinking foreground attribute and lets you create bold background screen colors.

```
N BLINKOFF.COM
A 100
MOV AX,1003
MOV BL,0
INT 10
INT 20
```

```
RCX
9
W
Q
```

End

Use the Debug script BLINKON.SCR to create the executable program BLINKON.COM, which disables the bold background attribute and lets you create blinking foreground text.

```
N BLINKON.COM
A 100
MOV AX,1003
MOV BL,1
INT 10
INT 20
```

```
RCX
9
W
Q
```

End

C:\DOS directory) to decompress the program and copy it to your hard disk. If, for example, you want to put DEBUG.EXE in your C:\DOS directory, the correct command is:

```
EXPAND A:DEBUG.EX_ C:\DOS\DEBUG.EXE
```

The most common problem readers make when using the Debug scripts published here is forgetting to make sure that DOS can find Debug. The second

most common problem is forgetting to include blank lines in the scripts. For example, in both BLINKOFF.SCR and BLINKON.SCR, you must place a blank line between INT 20 and RCX. If you don't do this, Debug refuses to create a COM file.

Missing, Presumed Erased

R. Hunsdorf has a missing-file problem of an entirely different sort. Midway through typing in one of *DRG's* QBasic programs, he encountered a FUNCTION command. When he typed in the command, the program "self-erased."

If you've never written a Basic program, or if your Basic experience is limited to GW-Basic, BasicA, or older versions of Apple and Microsoft Basic, QBasic's functions and subprograms may give you trouble at first. Because QBasic views every subprogram and function as a separate piece of the program, it assigns each of them to its own "page" in the editor. This lets you work on a particular subprogram or function without worrying about, or even seeing, the rest of your program.

When Hunsdorf typed FUNCTION, QBasic recognized that he was defining a new function and moved it to a new page, created an END FUNCTION line, and waited for him to type the body of the function. If this ever happens to you, you can look back at the rest of the program in three ways:

- By choosing the View menu and selecting the Subs option. You'll then see a box containing the program name and the name of each of its subprograms and functions. To select one of them, move the cursor bar to the entry you want to see and press Enter (or click with your mouse).
- By pressing F2. The same box mentioned above appears, and you follow the same procedures for moving among the pieces of your program.
- By choosing the Split option from the View menu to display a divided editing screen. You then will be able to press View or F2 to position two



IS IT OR ISN'T IT A DOUBLESPEACE DISK?

If you sometimes use DoubleSpace to compress your disks, and you have a batch file that needs to know how much space is available on a particular disk, here's a quick way to find out if the disk was compressed by DoubleSpace. My program TESTDS.COM returns an errorlevel value of 1 if the current drive is compressed and a value of zero if the current drive isn't compressed.

To create TESTDS.COM, first use an editor capable of saving files in ASCII (text) format to create a Debug script named TESTDS.SCR. Double-check the file carefully to make sure you typed all the numbers correctly, then issue this command to create TESTDS.COM:

```
DEBUG < TESTDS.SCR
```

To use TESTDS.COM within a batch file, you simply include the command TESTDS. For example, the sample batch file, TESTCOMP.BAT, tests whether a disk is compressed, uses an IF ERRORLEVEL test to issue the appropriate message, and then ends. To use TESTCOMP.BAT, you must log onto the drive you want to test before invoking the batch file.

—Doug Lowe

Use the Debug script TESTDS.SCR to create the executable program TESTDS.COM, which lets you determine whether a disk was compressed by DoubleSpace.

```
E 100 B4 19 CD 21 88 C2 B8 11
E 108 4A BB 01 00 CD 2F 09 C0
E 110 75 09 F6 C3 80 74 05 B0
E 118 01 EB 02 B0 00 B4 4C CD
E 120 21
RCX
21
N TESTDS.COM
W
Q
```

End

The sample program TESTCOMP.BAT shows how you might use TESTDS.COM within a batch file.

```
@ECHO OFF
TESTDS
IF ERRORLEVEL 1 GOTO ISDS
ECHO CURRENT DRIVE IS NOT COMPRESSED
GOTO EXIT
:ISDS
ECHO CURRENT DRIVE IS COMPRESSED
:EXIT
```

End

different parts of your program in the two windows.

Functions aren't the only aspect of QBasic giving Hunsdorf problems, however. When he tried using DATA and READ commands to create a QBasic program that stored the periodic table of elements, he got an error message on the eleventh element or third data line. (He put five weights and elements on each line.) When he created the table in GW-Basic or QuickBasic, the converted table worked fine.

Without seeing a copy of the program, I can't say for sure what caused this problem, but my first guess is that his program reads element weights and names into arrays. If the program doesn't dimension the array, or if he mistyped the name of the array at some point in the program, QBasic will report a "Subscript out of range" error when it tries to read the eleventh element.

Another possibility is that he made an error I've committed many times: He accidentally put a comma at the end of a line of data items. When you do this, QBasic assumes that you are including another item, a blank string, at the end of the line. If your program is alternately reading strings and numbers, it gets confused, tries to read a string as a number, and reports an error. Every time I get an error on a DATA or READ statement, I immediately look for trailing or missing commas. I almost always find one.

The End

Finally, we come to the last chapter (I hope) of the great Ctrl-J mystery. If you've missed the earlier installments, let me bring you up to date.

In DRG#11, a reader asked why Debug displayed ^J (Ctrl-J) at the beginning of each line of his scripts. This made Debug report an error in every line, and, as a result, it refused to create the COM programs he wanted. I answered—incorrectly—that his editor must be adding a tab character to the beginning of each line.

In DRG#13, two readers politely took me to task for calling ^J a tab character. In reality, they said, it's a line-feed character. I immediately guessed that the original reader's editor was adding extra line feeds between lines. I tested that hypothesis by creating files containing both extra line feeds and extra carriage returns. Debug didn't flinch.

I was stumped. Why did ^J appear in one reader's scripts but not in others? Why couldn't I recreate the problem on my own computers? I wasn't even sure whether Debug or the DOS redirection routines were handling the extra line feeds and carriage returns on my computer, but I guessed that DOS was. For some reason, the extra line feeds were being sent to Debug on at least one computer, and it was reporting an error message. Why? I appealed to DRG readers for assistance.

Three of them responded: Amer Neely of London,

Ontario, J. Coughlin of Belleville, Ontario, and Osvaldo Schwarz of Brazil. All offered the same explanation, and, as it turned out, I was on the wrong track.

It's easy to see how I was led astray. When something goes wrong with a computer, I do what comes naturally. I look at the symptoms first. The error occurred in Debug, so I reasoned that perhaps Debug was the problem. The error involved extra line feeds, so maybe an editor was adding them to a file.

But looking back, it's clear that no self-respecting editor would add extra line feeds willy-nilly. Debug can't be the problem, either, because if it were I would have received similar complaints from lots of readers. DRG readers must use just about every version of DOS and every version of Debug released by Microsoft, IBM, Digital Research, or Novell. They probably also use almost every popular commercial and shareware text editor, too. Again, if either type of program was causing the problem, I would have received numerous complaints.

So, the culprit isn't DOS, Debug, or the text editor. What does that leave? Another component of the computing environment: a memory-resident program. Probably a shareware program called DOSEdit.

In the days before DOSKEY, many people used DOSEdit to do some of the things that DOSKEY now does: to view, edit, and reissue commands previously typed at the DOS prompt. Some of those people still use DOSEdit, of course, because they're accustomed to it, or because they haven't upgraded to a DOS that offers DOSKEY. At one time, all three of my correspondents used DOSEdit, and all of them had trouble with ^J appearing in their Debug scripts. Remarkably, the problem disappeared as soon as they removed DOSEdit from their AUTOEXEC.BAT files and rebooted.

The real lesson here is that to solve mysteries, you have to look beyond circumstantial evidence. (After all, maybe someone else left the butler's gloves at the scene of the murder.) Proceed logically. Try to make the problem go away by changing your AUTOEXEC.BAT or CONFIG.SYS file. Does it disappear if you remove memory-resident programs, if you reboot, or if you use your application programs in a different order, for example?

When a computing problem arises, no matter how closely it appears linked to a specific application or utility, remember that everything your computer does is affected by everything else it has done since you turned on the power.

And don't be afraid to question other "witnesses." Sometimes when the game's afoot, you need all the help you can get to track down the real culprit. ■

Technical Editor Hardin Brothers has been working with and writing about computers for 14 years.

G O O K I N O N D O S

Living Comfortably with DOS Programs in Windows

by Dan Gookin

Face it, Windows was designed to run Windows programs. Yeah, it says on the side of the box that it can handle DOS programs, and I'm sure Microsoft employees have spent many long days trying to get old DOS workhorses to run in Windows. But Windows is for Windows programs. It's only out of being nice that DOS programs can run at all. So why not make the best of it?

Full Screen Or Windowed?

Running a DOS program in Windows is simple. Normally you'll locate its icon—just as you would a Windows program—double-click on it, and the DOS program appears on the screen as if Windows wasn't even there. (For more information on setting up DOS programs under Windows, refer to my last column, "Make Windows Roll Over and Play DOS," *DRG*#15, page 15.) This is what's known as running a DOS program in text mode. It's also called full-screen mode because, like DOS itself, programs cover the whole screen when they run.

Also available to DOS programs is windowed mode, where the program appears in a window just like other Windows programs. To achieve it, you press Alt-Enter (simultaneously). Your DOS program floats on the screen like any other Windows program (see the photo on page 22). The Alt-Enter command also switches DOS programs back to full-screen (text) mode if you tire of windowed mode.

There are a few limitations to this trick. First, it works only when you run Windows in 386 Enhanced mode (which is what most people use). Second, some (but not all) graphics programs refuse to run in a window, or they do things too slowly to be useful.

Another problem is that you can't see the entire screen when the DOS program sits in a graphical window. That problem can be solved easily, however, by adjusting the DOS text size or font.

Adjustable Windows

Having your DOS program float in a window is only half the battle. Once it gets there, you may notice that you can't see all of it at once. There are two solutions. The first is to maximize the window by clicking on the up-arrow button in the upper right corner. If that doesn't do the job, you'll need to adjust

It's only out of being nice that Windows can run DOS programs at all. Still, why not make the best of it?

the size of the characters displayed in the DOS window. That's done with the Fonts command.

To access the Fonts command, press Alt-spacebar. This drops down the Control menu on your DOS window. The Control menu is a Windows-only thing, not part of your DOS program. It's used to control the window in which your program is displayed, plus a few other specifically DOS-only things.

The Fonts command is activated by pressing the F key. You'll see the Font Selection dialog box. Various fonts are listed in the Font box, a preview of the font size appears in the Selected Font box, and the way it affects the DOS window size appears in the Window Preview box.

Most of the font sizes are pretty goofy. The 4×6 size is almost useless—unless you have a big monitor. The 7×12 or 8×12 are the sizes I prefer. They keep the screen more or less proportional, and you get to see most of your program without having the window get too large.

Try out a few of the fonts before settling on one.

Check both preview windows to see how you like the text and window position. Then, click your mouse on the Save Settings on Exit check box to put an X in there. That way Windows will remember the font settings the next time you run your DOS program. Click on the OK button to return to the program.

Switching Between DOS Programs in Windows

One of the advantages you get with Windows is that you can run several programs at once. They may not need to run all at the same time, like some bizarre watchworks. Instead, the advantage of "running" them all at once is that you don't have to quit one program, start another, quit it, then return to the first. You can run them both simultaneously and then just switch between them. That's the essence of Windows multitasking, and it also works with DOS programs.

Start one DOS program in Windows, then press Ctrl-Esc. If you're in text mode, the DOS program disappears, and you're back in Windows, faced with a dialog box called the Task List. If you're running your DOS program in graphical mode, the Task List appears over the top of your program.

Select the Program Manager from the list, or the File Manager if you like it better (or the Norton Desktop, if you're using that), and then start another DOS program. Like magic, you're running two DOS programs at once.

Both programs may not actually run at the same time, which is fine, since most programs require your eyes on the screen and hands dancing on the key-

board for them to do anything. But the point is that you're running two programs and don't have to quit either of them to switch back and forth. (Sometimes, however, you might want to quit to get out of a freeze-up or other problem. For more on this, see the sidebar "Quitting a DOS Program in Windows, Sometimes Deliberately.")

The switching is accomplished using the Alt-Tab key combination. You press and hold the Alt key and then tap the Tab key once. The name of another program will then appear on the screen in front of you. If that's not the program to which you want to switch, you just press the Tab key again—keeping your thumb (or whatever) on the Alt key. When you find the program you want—whether it be a DOS or a Windows program—release both keys. Zap! You're there.

This is technically referred to as *task switching*. You can work on only one program at a time, which is called the "foreground" task. Other programs are "in the background." There's no need to quit to run another program; just press Alt-Tab until you've switched to it. I've run several DOS programs this way, switching back and forth between them without ever bothering with Windows or the graphics screens.

Copying Info Between DOS Programs

Running your DOS programs in windowed mode means you can take advantage of a crude form of cut and paste between DOS and Windows programs. Only text can be copied, though you can copy be-

QUITTING A DOS PROGRAM IN WINDOWS, SOMETIMES DELIBERATELY

There are a number of ways to quit Windows programs, but few of them work on DOS programs run in Windows. Generally, the rule is you quit a DOS program just as you would in DOS. Press Alt-X, the F7 key, slash-Q, whatever. If you try to quit the DOS program by closing its graphical window, you'll be greeted with a polite message telling you it can't be done. DOS programs must be quit properly in Windows.

Of course, as with everything in a computer, the rule isn't always true. Sometimes it becomes necessary to kill off a DOS program running amok in Windows. There are two ways to do this.

First, if you can, press Alt-spacebar to bring down the Control menu. Press T to select the Settings command. In the dialog box, click on the Terminate button. This brings up a nifty warning dialog box that tells you Windows is about to rub out your DOS program permanently, which should be done only if there's no other way out. Click OK and hope the DOS program goes away.

The second way to rid yourself of an errant DOS program is to make sure you're using it (its window is in front or it's in the foreground), and press Ctrl-Alt-Delete. Wait a moment, and Windows displays a nice warning telling you the consequences of pressing Ctrl-

Alt-Delete. If a program has gone ga-ga, you can press the Enter key, and Windows will wipe it away for you.

These two methods are recommended only as a last hope. If you're ever forced to use them, I advise you to close up all other programs, quit Windows, and reset your computer. Then start over. Programs occasionally run haywire. Windows tries its best to keep the situation under control, but there is no guarantee that one faulty program hasn't disturbed other parts of the system. Be safe.

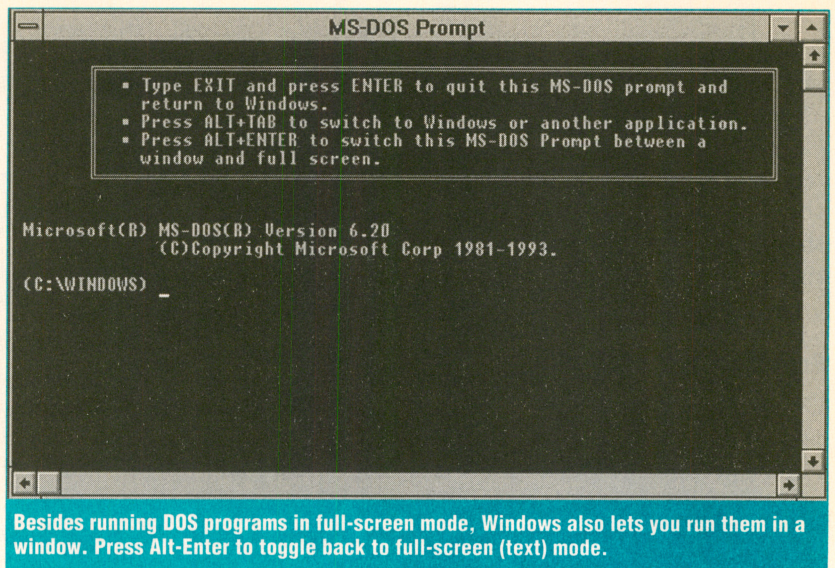
—D.G.

tween two DOS programs or a Windows and a DOS program. While this may not seem like a handy trick, it's one you might really use—especially if you often hop between two programs to get your work done.

To copy information from a DOS program, press Alt-spacebar to display the Control menu. Press E to select the Edit command. That displays the Edit sub-menu. Then press Enter to select the Mark command. Your DOS program will be “frozen.” The window's title changes to add the word *Mark* before the program name. Your job is to use the mouse to select a block of text on the screen. Press the Enter key after selecting the block of text; press Escape to cancel.

After marking the block of text, you can continue using the DOS program. The text has been copied to Windows' Clipboard. From there you can paste it into a Windows program or paste it into another DOS program.

To paste, switch to the program into which you want to paste the text. Pasting text works just like typing it from the keyboard. If you paste into a DOS program, the text gets plopped down on the screen



the same as if you pasted it into a Windows program.

When you're in the application to which you want to paste, move the cursor to where you want the text to appear. Then press Alt-spacebar to bring down the Control menu. Press E to select the Edit command, then press P to Paste. The text appears on the screen as if you're typing it in from the keyboard.

All That PIF Nonsense

One way Windows clubs you in the face when it sees a DOS program is by tossing around this PIF (Program Information File) stuff. A lot of people wrongly accuse PIFs of being complex and frustrating. The truth is, you never need to bother with a PIF. They control some multitasking aspects of DOS programs under Windows and, for most of your programs, there's no point in messing with a PIF.

Most of the DOS applications that need a PIF will come with one automatically. WordPerfect comes with PIFs for Windows, for example. In that instance, you would set up Windows to “run” the PIF instead of running WP.EXE directly. The PIF will run WordPerfect, but before it does it will make Windows cozy for WordPerfect, adjusting memory requirements and other technical settings.

There are a few instances when I recommend someone bother with creating a PIF for a DOS program. The first is with some communica-

ABOUT THOSE MOODY MODEM PROGRAMS

One touchy type of DOS program from which you may not want to switch away with Windows' Alt-Tab key combination is a communications program. It sounds like a dream: You dial up an on-line service and download a huge file; meanwhile you're off doing something else while the file keeps downloading. Most of the time that may work, but don't rely too heavily on it. Comm programs used this way have been known to lock up systems and cause other weirdness.

If you're going to use a DOS communications program in Windows, I'd advise you to take the following steps:

1. After the program starts, press Alt-spacebar to see its Control menu.
2. Press T to select the Settings command in the Control menu. You'll see the Settings dialog box.
3. Put an X in the check box beside Background. That ensures that the program will continue to run even when you're not looking at it (when it's “in the background”). Use your mouse to click an X in the box, or press the B key, if an X isn't there already.
4. Click the OK button to return to your program.

An alternative approach is to create a PIF for your communications program. In the PIF dialog box, again put an X in the Background box. Save the PIF to disk with the same filename as the DOS communications program and in the same subdirectory. Then, “run” the PIF instead of the DOS program name in Windows. That will set up background operation automatically.

—D.G.

DOS-IN-WINDOWS KEY COMMANDS

Following are the most important key combinations for working with DOS programs in Windows. Keys separated by a hyphen (-) should be pressed simultaneously, while those separated by a comma (,) should be pressed one after the other.

KEY COMBO	COMMAND
Alt-Enter	Switch between full-screen (text) and windowed mode
Alt-spacebar	Switch to windowed mode and display Control menu
Alt-spacebar,F	Display Font Selection dialog box
Alt-spacebar,E,K	Mark text for copying
Alt-spacebar,E,P	Paste text into a DOS application
Alt-spacebar,T	Display Settings dialog box
Alt-Tab	Switch between windowed programs
Ctrl-Esc	Display Task List

tions programs, which is discussed in the sidebar "About Those Moody Modem Programs." The second is when you have a DOS program that uses one of Windows' sacred key combinations (see sidebar above).

For example, suppose you have a DOS program that uses the Alt-Enter key combination for some purpose. If so, you'd find Windows "stealing" Alt-Enter from the program, using it to switch between text and graphics modes instead of doing whatever Alt-Enter was supposed to do. To fix that problem, you need to create a PIF for your program and "reserve" the Alt-Enter key combination for use by the program and not Windows.

To create a PIF, you start the PIF Editor program. Type the DOS program filename at the Program Filename prompt. That's the only required information, though you can fiddle with other options as you see fit. If you don't understand an option, leaving it blank or unchanged is the best course.

Clicking on the Advanced button displays the Advanced Options panel, which you also can ignore—save for the Reserve Shortcut Keys options near the bottom. Click the mouse in a box to put an X by the key combination your program needs. For example, click next to Alt-Enter to have your program use that and not Windows.

Save the PIF to disk in the same directory as the program it runs, using the same filename. For example, WordPerfect's PIF is named WP.PIF, and it lives in the same directory as WordPerfect.

Conclusion

Windows is by no means the answer to all of DOS's woes. Bluntly put, Windows is for running Windows programs. If you don't have any Windows programs, then there's no need to bother with it. But if you're stuck using Windows for one reason or another, it can be made quite livable for DOS programs, and you can have some fun with it, running DOS programs in graphical windows and cutting and pasting between programs. It may not be nirvana, but it

certainly isn't the DOS-hell you may have imagined. ■

Dan Gookin is a Contributing Editor of DOS Resource Guide. Additional information on using Windows and DOS programs can be found in his book, The Microsoft Guide to Optimizing Windows (Microsoft Press, 1994).



KEEPING IT LEGAL

If you have a batch file that expects the user to enter a disk drive letter as a parameter, you can use the following lines to make sure the parameter represents a legal disk drive:

```
@ECHO OFF
SET PARM1=
FOR %%V IN (A A: a a: B B: b b:) DO IF "%1"=="%V"
SET PARM1=%1
IF NOT "%PARM1%"==" " GOTO GOODPARM
ECHO That's not a proper drive letter!
GOTO EXIT
:GOODPARM
REM The rest of your batch file goes here...
:EXIT
```

Add these lines to the beginning of your batch file. The FOR command tests the first parameter entered by the user against all valid ways to type a drive letter. If the parameter matches any of the permutations, the environment variable PARM1 is set to the parameter (if you type A, for example, the value of PARM1 is A). Next, an IF command tests to see if PARM1 was set. If so, the batch file jumps to the label GOODPARM, the section of the program in which you insert the batch-file commands you want executed. If PARM1 wasn't set, the batch file displays an error message and jumps to the label EXIT, and the program ends.

—Doug Lowe

RECOVERING FROM DISASTER

The Three Faces Of UNDELETE

Revised from its DOS 5 offering, MS-DOS 6.x's UNDELETE now incorporates the latest in fail-safe technology.

by Hardin Brothers

Last night, I dropped a crystal wine glass. As I watched it slowly float toward the kitchen's tile floor, and tried vainly to get my foot underneath it to cushion the drop, I felt my stomach fall with the glass. It's the same feeling I get when I accidentally delete an important file.

Luckily, undeletion utilities are nearly as old as PCs, and they are becoming smarter and safer to use all the time. And fortunately for PC users, DOS 5 and later include powerful undeletion utilities that can save your files—even if they can't put smashed crystal back together again.

The way these programs pick up the pieces of a file—which often are scattered across a disk—and “glue” them back together is quite a feat. And their methods vary, according to the program you run. Understanding the many ways in which programs can recover lost files will help you make the most of DOS's UNDELETE. You also should know

that you must handle UNDELETE with care (see the sidebar “How to Get the Most from UNDELETE”). To start things off, though, let me tell you a bit about how files are stored on disks and what happens when you delete them.

By the Numbers

As you may know, every file on a disk has an entry in a directory, either in the root directory or a sub-directory. The directory entry has five parts: the file's name and extension (for example, TEST.TXT), its attributes (archive, system, hidden, and/or read-only), the time and date when the file was last updated, its length, and its first storage cluster.

Most of the directory information should sound familiar. You can see a file's name and extension, as well as its date and length, by issuing a DIR command. And, you can view and change its attributes using ATTRIB. This leaves only one piece of directory information that needs explanation: the file's first storage cluster.

When you format a floppy or hard disk, DOS divides it into

physical sectors and logical clusters, or allocation units. The size of a cluster depends on the total size of the disk and the version of DOS you use. If you are curious, you may run the CHKDSK command, which reports the size of each allocation unit in bytes.

DOS's File Allocation Table (FAT), which is stored at the beginning of each disk, keeps track of each cluster. The FAT maintains one entry per cluster. Each entry contains a number that DOS uses to decide if the cluster is unused, reserved, bad, or part of a file. If a cluster is part of a file, and if it isn't

UNDELETE: Protects against accidental file deletion and attempts to recover files after they have been deleted by an application program or by the DEL or ERASE command.

Command type: External.

Available: DOS 4.0 and later. Enhanced in DOS 5 with the addition of the MIRROR utility. DOS 6.x's overhaul excludes MIRROR but adds Delete Sentry and Delete Tracker modes.

Technical Editor Hardin Brothers has been working with and writing about computers for 14 years.

the last cluster in a file, its entry in the FAT contains the number of the next cluster in the file. So, to find where it has stored your file, DOS looks in the directory for the first cluster. Then it looks in the FAT to find each successive cluster until it comes to the end of the file.

Why is all of this important?

Because of the way DOS erases files. When you use the DEL or ERASE command, or when an application erases a file, DOS takes the simple way out. Instead of erasing the data on the disk, it simply changes the first character of the directory entry to show that the file was erased, and then it changes the

FAT to show that each cluster the file was using is now free. Whether you are erasing a 1-byte or 1MB file, DOS changes only one character in a directory and makes some simple alterations to the FAT.

The newly free disk space still contains your data. In fact, your data stays on the disk until a new

HOW TO GET THE MOST FROM UNDELETE

Installation

To install UNDELETE in sentry mode so that it moves every file you erase to a hidden subdirectory, type `UNDELETE /S` or `UNDELETE /S[d]`, where *d*, which is optional, is a valid drive letter.

To install UNDELETE in Tracker mode so that it keeps name and cluster information about every deleted file, type `UNDELETE /T` or `UNDELETE /Td[-n]`. *d* is any valid drive letter (except those created with JOIN or SUBST), and you must include it. *-n* is the number of file records Tracker keeps on hand; its value may range from 1 to 999. If you omit the number, Tracker uses the size of your disk to determine how many entries to keep.

To control the operation of UNDELETE through a file named `UNDELETE.INI`, type `UNDELETE /LOAD`. To remove UNDELETE from memory, type `UNDELETE /UNLOAD`.

Keeping Things under Control

Typing `UNDELETE /?` displays a list of UNDELETE's options.

To view UNDELETE's status and the method it is using for each drive, type `UNDELETE /STATUS`.

Typing `UNDELETE /LIST` generates a list of files that the utility might be able to recover. The list shows the number of files that each undeletion strategy can recover.

You may narrow the range of files with `UNDELETE filename /LIST`, where *filename* includes any combination of drive letter, path, filename, and wildcards you may use in a DIR command. UNDELETE reports only on recoverable files that match the file specification you provide.

You may narrow the report even more, asking for files that could be recovered with just one of the recovery strategies. To see which files Sentry can recover, add `/DS` to the end of the `UNDELETE /LIST` command. Adding `/DT` tells you which files the deletion-tracking strategy can recover, and `/DOS` tells you which files the traditional method can recover.

Finally, if you need more disk space, you may purge the hidden `\SENTRY` subdirectory by typing `UNDELETE /PURGE` or `UNDELETE /PURGE d`, where *d* is the letter of a drive on which UNDELETE's Sentry is running. If you don't name a drive, `UNDELETE /PURGE` tries to operate on the default drive.

Recovering Files

If you type UNDELETE, the utility displays, one by one, each file it might recover, asking if you want to attempt recovery. You may narrow the list by including a filename and a `/DS`, `/DT`, or `/DOS` switch, just as with the `/LIST` option discussed above.

When you are recovering a file using the traditional (DOS) method, UNDELETE prompts you for the first character of the filename (unless it can figure out the name from the filename on the command line).

If you want UNDELETE to recover all files it thinks are recoverable, and you don't want to worry about answering prompts, use `UNDELETE /ALL`. You may add a filename, with or without wildcards, to the end of this command.

`UNDELETE /ALL` uses the Sentry recovery method, if it is available. If not, it uses the deletion-tracking method. And if that isn't available, it uses the DOS recovery method. If it must use the DOS method, the program automatically provides a first character for each file. It chooses that character in such a way that you don't end up with two files bearing the same name.

Warning!

No matter which strategy UNDELETE uses, it can't recover a file if you have removed its subdirectory. And the chances of a successful recovery decrease as you create new files and expand others. For the best chance of recovering a file, stop working as soon as you realize that you or a program has erased an important file. Run UNDELETE and try to recover the file before you do anything else. Then run CHKDSK to make sure that the subdirectory structure and FAT on your hard disk are in good shape.

Also, never operate DOS's version of UNDELETE while Windows or another multitasking program is running. (DOS 6.x provides two versions of UNDELETE. `UNDELETE.EXE` is for DOS; `MWUNDEL.EXE` is for Windows.) If you do, you might completely destroy your hard disk's data.

—H.B.

file is stored in some or all of the same clusters. Unless you use one of the utility programs that obliterates data from a disk, a simple DEL never protects your data from an intelligent snoop.

The “Traditional” Method

Assume for a moment you are an undeletion program that needs to recover a deleted file. If you look at the directory entry, it looks like any other valid entry, except that the first byte is a lowercase sigma (σ), or ASCII character 229. The length of the file, its attributes and time stamp, and even the first cluster of its data still are available. None of this essential information has been changed.

If you knew the file was so short that it used only a single cluster before it was erased, and if you could determine that the first cluster was not being used by another program, you might guess you had a pretty good chance of recovering the file. You simply could change the sigma at the beginning of the filename back to a proper first character and set the FAT to show that the cluster was in use.

Now assume that the original file occupied two or more clusters. You still could find the first cluster, but where would you look for the sec-

ond? If you knew the disk was defragmented not long before the file was deleted, you probably would reason that the file had occupied contiguous clusters, and you’d look in the next cluster. But if the hard disk had an empty cluster in one area and another in a different area—if it were badly fragmented—you wouldn’t know where to look for the rest of the file. The moral is that a longer file is more difficult to recover than a shorter one, and it is easier to undelete files if you keep your disk defragmented.

Consider one final scenario: Assume that another program now is using the first cluster of your deleted file. This nearly guarantees that you can’t recover your data (unless the new file is just a byte or two long, and you can stand to lose those first few bytes). When a new file is stored on top of any part of an old one, the data is gone for good, unless you own highly sensitive and very expensive equipment more suited to a spy laboratory than to an ordinary office.

“Traditional” undeletion programs find the erased files in the current directory and ask which you want to try to recover. Then they ask for the first character of the filename. And, finally, either

they make their own best guess about the clusters that originally belonged to the file or they ask you to guess. The recovery process is quite simple—as long as the disk wasn’t badly fragmented and no new files have been saved on the disk.

Subtle and Not-So-Subtle Approaches

The greatest impediment to recovering long files is that DOS doesn’t know where each file cluster was located originally. So, again suppose you were that undeletion program, allowed to lurk in memory and look over DOS’s shoulder each time it erased a file. You would write down the file’s name and keep track of the location of each cluster. That way, if someone asked you to restore the file, you would know which clusters it had owned.

Of course, after days and weeks and months of recording program names and cluster numbers for deleted files, you’d have a pretty long list. So, you’d probably add a way to discard old information as new files were deleted, in about the same way that most of us toss out old magazines as new ones arrive.

Of course, you’d have to make sure that none of the deleted file’s clusters were taken over by a new or growing file before you could perform an undelete. If you could do all of this, you’d be a pretty intelligent undeletion utility.

Now let’s take a different strategy. Suppose you were tired of looking for a file you deleted last week. Why couldn’t all of the file’s data be protected until you were sure you didn’t need it? To do this, you could choose one of two ways to hold onto your data for as long as possible.

The first method is to keep DOS from using the newly freed clusters, at least until no other clusters were free on the disk. As a sophisticated undeletion program, you probably could figure out a way to do that. But here’s an easier way:

**QBasic
TIP**

GETTING BACK TO DOS FROM QBasic

Many beginning QBasic programmers initially are cheered when they learn that they can use a command such as the following to invoke a QBasic program within a batch file:

```
QBasic /RUN program.BAS
```

When they try out this technique, however, they often find themselves in the QBasic editor when the program ends. This happens because they used an END statement as the final line of their QBasic program.

The solution is simple: Use the SYSTEM command to end any QBasic program you plan to use within a batch file (or any QBasic program you’re likely to invoke from the DOS prompt). When you do this, QBasic sends you back to DOS after the QBasic program ends.

—Lane Olinghouse

Suppose you could create a hidden directory on each disk. Directories can have hidden and system attributes just as normal disk files do, and most users would never be aware of a hidden directory. Being a sneaky sort of utility, you'd sit around and wait until the user asked DOS to erase a file. Then you'd jump in, take over, and move the file to the hidden directory.

Moving a file from one place to another on the same disk really is just a matter of copying its 32-byte directory entry from one directory to another. It's almost as fast as deleting a file, and few users would know the difference.

Next, you'd set a limit on the size of the hidden directory. If it got too large, you could start discarding the files that were erased first—the ones that had been around the longest. And if the user wanted to recover a deleted file, you'd look into the hidden subdirectory, find the right file, and move it back to the correct directory in a flash. The user would think you were a crackerjack program, because you'd never have garbled data in the file, and no new file would ever obliterate those that were in the special directory.

The subtle keeper of erased file-cluster numbers and the rather clumsy keeper of complete files in a hidden directory represent the two current methods of creating reliable undeletion utilities. The latter uses more disk space; the former takes a few extra risks. Which one would you hire for your computer?

The DOS Solution

Until DOS 4.x, all undeletion programs were third-party utilities, available either as shareware or as part of a collection of programs, such as Central Point Software's PC Tools or The Norton Utilities from Symantec Corp. Then Microsoft added an undeletion program to DOS 5 and improved it greatly in DOS 6.x.

DOS 5's UNDELETE offers two

choices. Normally, it uses the traditional method, which is most satisfactory for very short files. But a companion program, called MIRROR, takes the subtle approach described above. It sits in memory and records the full filename and the cluster numbers of a file just before DOS deletes it. MIRROR keeps its records in a hidden file in the root directory; if UNDELETE finds that hidden record file, and if a record of the target file exists, UNDELETE uses MIRROR's information to make file recovery more reliable.

That seems great, and a lot of DOS 5 users run MIRROR from their AUTOEXEC.BAT files every time they boot up. Of course, a lot of them also upgraded to DOS 6.x and found that MIRROR had disappeared. In its place, Microsoft added a single UNDELETE command offering three modes of operation and confusing documentation.

DOS 6.x's UNDELETE combines the functions of MIRROR, DOS 5's UNDELETE, and the ability to use all three strategies I've mentioned. But, if you want to live dangerously, you may simply run UNDELETE when you accidentally erase a file. It uses the traditional method of recovery, which, for some reason, Microsoft calls the DOS method.

Or, if you'd rather, you may run UNDELETE from your AUTOEXEC.BAT file and choose either of two improved strategies. One, called dele-

tion tracking, stores the path and filename of each deleted file and the clusters that the file used. When the storage file reaches a certain size, old data is thrown out to make room for the new. You really don't lose any security when this old data is discarded because, by then, it's likely that the disk clusters have been overwritten.

But if you want complete UNDELETE security, you'll run the program in Sentry mode, which copies each "deleted" file to a hidden subdirectory, called \SENTRY, giving the file a strange, garbled name and storing the original filename in a special data file. It uses the garbled names plus the data file because it's possible, even likely, that you or someone else will delete two files with the same name from different subdirectories, or erase a file, re-create it with the same name, and erase it again. Those kinds of shenanigans don't bother UNDELETE's Sentry at all.

UNDELETE keeps its \SENTRY directory from taking up too much room on your hard disk, and, if you desperately need the space, you may purge the directory with a single command.

It really is quite a flexible program, when you get used to it. And it will help you avoid that sinking, the-glass-is-about-to-smash feeling the next time you erase a file by mistake. ■



DON'T REFORMAT THAT DISK!

If you have DOS versions 3.2 through 4.x, it's all too easy to get yourself into big trouble by typing a command such as `FORMAT C:` instead of `FORMAT B:` or `FORMAT A:`. Fortunately, however, you can reduce the chances of accidentally reformatting your hard disk by using the `LABEL` command to assign a label to the disk. When a disk has a label, these versions of DOS ask you to type in its name before they format the disk. (Chances are, if you have to think about a label name, you'll realize what is about to happen.)

Assigning a label is simple. Log onto the drive whose hard disk you want to protect and type `LABEL name`, where *name* is the label you want to assign to the disk.

—Doug Lowe

ScanDisk Repairs Hard Drive Data

MS-DOS 6.2 adds a maintenance utility with substance. Not a replacement for CHKDSK, ScanDisk is a data and hard drive repair tool.

by Doug Lowe

If you've been computing as long as I have, CHKDSK is like an old friend, and not one you want to part with lightly. But ScanDisk, added to MS-DOS 6.2, is a vast improvement in disk and data safety, and essential to those using MS-DOS DoubleSpace compression.

In contrast to CHKDSK, which can tell you if a portion of a file has been lost by checking the File Allocation Table (FAT), ScanDisk diagnoses flaws in your hard disk's surface, detecting and eliminating "bad sectors," those portions of your disk's recording surface that have become damaged in some way so that they can no longer reliably record information.

ScanDisk not only tests every sector of the disk surface, noting any defects it finds in the disk's FAT, it prevents DOS from storing a file in a bad portion of the disk.

Contributing Editor Doug Lowe is the author of 15 computer books, including The Only DOS Book You'll Ever Need (Murach), The Least You Need to Know About DOS (Murach), and The Microsoft Press Guide to DoubleSpace (Microsoft Press).

Further, ScanDisk makes every effort to relocate any data it finds in a damaged area to an undamaged area of the disk.

Scanning a Disk

To get a feel for how ScanDisk works, follow the sample ScanDisk session shown in the sidebar "Taking ScanDisk for a Test Drive."

ScanDisk begins by verifying the integrity of the logical structures on your disk much the same as CHKDSK. Next, it analyzes the drive's surface by reading and writing every sector of the drive. This is time-consuming; be prepared to let ScanDisk run unattended for a while. My 240MB drive took approximately 20 minutes. ScanDisk will estimate the time for you.

Most of ScanDisk's screens contain a More Info button for extra information about what ScanDisk is doing—or what it proposes to do. For example, if ScanDisk tells you that it has unearthed cross-linked files and you're not sure what cross-linked files are, click the More Info button for a definition of cross-linked files and a list of the files that are cross-linked.

If ScanDisk does discover a disk problem and you decide to go ahead and have it fixed, the program asks whether you want to create an Undo disk. To create an Undo disk, insert a blank, formatted floppy disk into drive A and click on the Drive A button. ScanDisk will write a snapshot of the drive's current FAT and directory status to the disk.

Then, in the unlikely event that your disk is even worse off after ScanDisk supposedly "fixes" it, you can easily revert to the way things were by inserting the Undo

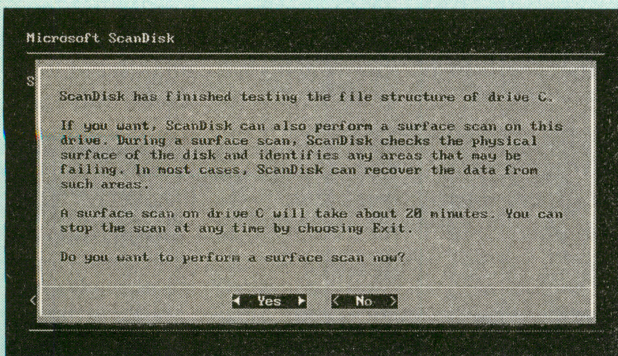
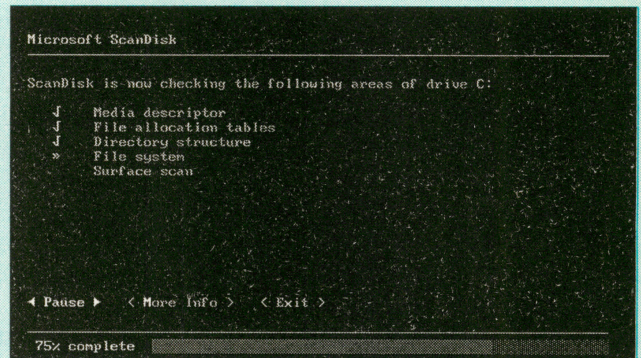
ScanDisk: ScanDisk is a diagnostic and repair tool that analyzes the reliability of your storage media—hard disks and floppies. ScanDisk has the ability to lift data from so-called "bad sectors" on your disks and move them to reliable sectors, thus reducing the chances of data loss. It is an essential companion tool to DoubleSpace, MS-DOS 6.0's compression utility, since removed.

Command Type: External

Available: MS-DOS 6.2

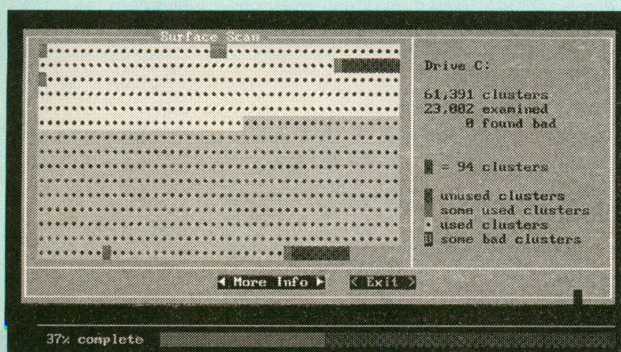
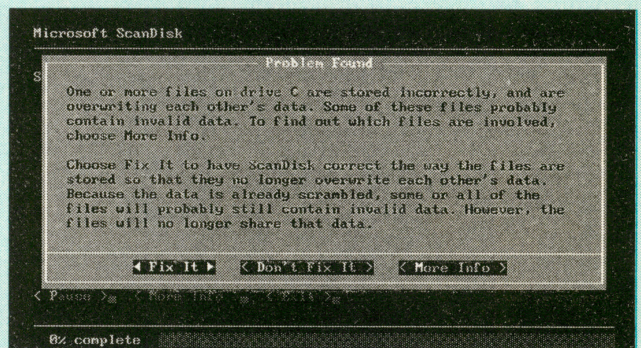
TAKING SCANDISK FOR A TEST DRIVE

1. Start by typing SCANDISK at the MS-DOS prompt. ScanDisk first checks the data structures used by MS-DOS to keep track of your files and directories, much as CHKDSK does, but with a more attractive display. The screen shows a list of five tests ScanDisk will perform in sequence. Checkmarks indicate which tests the disk has passed, the arrow indicates which test is currently underway, and the bar chart at the bottom tracks the progress of the current test.



3. If ScanDisk finds an error, it displays a detailed message and asks if you want to correct the problem. If you do want to correct the problem, it gives you the option of recording the information necessary to restore your drive to its original state on an Undo disk. (To take advantage of Undo you'll need a blank, formatted disk.) ScanDisk writes a "snapshot" of the drive's current File Allocation Table (FAT) and its directory status to the Undo disk. If you don't understand the problem detected by ScanDisk, you can select the More Info button to display additional help.

2. When ScanDisk has finished checking the disk's data structures, it asks if you want to perform a surface analysis to see if there are any defects in the disk media. Press Y to perform the surface scan or N to skip it. ScanDisk analyzes the disk's surface by reading from and writing to every sector of the drive. It can be a lengthy task; ScanDisk will estimate for you the time involved. For example, analyzing a 240MB hard drive might take up to 20 minutes or so.



4. ScanDisk next tests your disk's reliability to store and retrieve information. ScanDisk shows you its progress in a colorful style. The central portion of the screen is a map of your disk drive's storage space, with each dot representing a group of clusters whose size depends on the size of your disk (in this case, each dot represents 94 clusters). The legend at the right explains the meaning of each symbol, and the status bar at the bottom shows the progress of the test.

—D.L.

HOW SCANDISK HELPS DOUBLESPEACE GET GOING

When you install DoubleSpace with MS-DOS 6.0 or an early version of 6.2, it calls on ScanDisk to perform a surface analysis of your drive before any of your precious data is compressed. Why? Because defective disk drives were one of the most common causes of trouble with DoubleSpace under MS-DOS 6.0. (DoubleSpace doesn't cause media defects, but a drive compressed with DoubleSpace is more likely to unwittingly stumble across a latent media problem than a non-DoubleSpace drive.)

ScanDisk works like a mine detector, advancing before DoubleSpace to see if there are any bombs buried beneath the disk's surface before DoubleSpace marches through. ScanDisk lengthens the DoubleSpace installation process, but the additional time is well spent.

—D.L.

disk in drive A and typing the following command:

```
SCANDISK /UNDO A:
```

To make it work, you'll have to use the Undo disk before you do anything that might further alter the FAT or directory structure of your disk.

ScanDisk and DoubleSpace Drives

The SCANDISK command is particularly welcome for people using Microsoft's briefly lived disk compression program, DoubleSpace. ScanDisk can detect whether a drive has been compressed by DoubleSpace and perform specific tests to verify the integrity of the DoubleSpace system.

Most important, ScanDisk knows that compressed disk data is stored in a Compressed Volume File, or CVF, that resides on a host drive. (See the sidebar "How ScanDisk Helps DoubleSpace Get Going.") When you run ScanDisk against a compressed drive, ScanDisk checks not only the compressed drive's logical structure, but the structure of the host drive as well.

ScanDisk also checks several internal structures that are unique to DoubleSpace drives: the DoubleSpace file header, the DoubleSpace File Allocation Table (the MDFAT), and the Bitmapped File Allocation Table (the BitFAT).

It's not important that you know what these structures are, but you'll rest easier knowing that ScanDisk knows what they are!

Batch-file programmers will also benefit from ScanDisk. Add it to the list of DOS commands that issue exit codes after their work is done. You'll be able to incorporate these codes in maintenance checks of your own.

Here's an example of how you can use ScanDisk and its exit codes. ScanDisk issues the following exit codes:

- 0 No problems detected.
- 1 Syntax error on command line.
- 2 Not enough memory or other internal error.
- 3 Interrupted by user.
- 4 Surface scan interrupted by user. No errors discovered during logical tests.
- 254 Problems found but corrected.
- 255 Problems found but not corrected.

Batch-file writers will be able to test ScanDisk's performance using DOS ERRORLEVEL statements. Your batch file will have to determine how each exit code should be handled. Codes 0 and 254 indicate that ScanDisk ran to completion and no errors were discovered or any errors that were discovered were repaired; code 255 means that an error was discovered but not repaired,

SCANDISK SWITCHES

ScanDisk has a number of switches you can use to automate its operation. These are useful mostly if you invoke ScanDisk from a batch file and you want it to run without intervention from the user.

<i>drive letter</i>	Checks the specified drive.
/ALL	Checks all drives.
/AUTOFIX	Automatically fixes any errors that are discovered. (You can't use /AUTOFIX and /CHECKONLY together.)
/CHECKONLY	Checks for errors but does not fix any errors it discovers.
/CUSTOM	Tells ScanDisk to use the Custom Section settings in the SCANDISK.INI file.
/MONO	Tells ScanDisk to use a monochrome display instead of color.
/NOSAVE	Automatically deletes lost clusters. Used with /AUTOFIX. If you use /AUTOFIX without /NOSAVE, lost clusters are saved to files just as with the CHKDSK command.
/NOSUMMARY	Suppresses the summary screen displayed when ScanDisk finishes checking a drive.
/SURFACE	Forces ScanDisk to perform a surface analysis.

—D.L.

SCCUSTOM.BAT is a simple ScanDisk batch file that employs ScanDisk's exit codes.

```
SCANDISK /ALL /CUSTOM
IF ERRORLEVEL 255 GOTO BADDISK
IF ERRORLEVEL 254 GOTO GOODDISK
IF ERRORLEVEL 1 GOTO NOTDONE
:GOODDISK
ECHO THE DISK HAS BEEN CHECKED AND ANY ERRORS WERE REPAIRED!
GOTO EXIT
:BADDISK
ECHO THE DISK STILL CONTAINS ERRORS!
GOTO EXIT
:NOTDONE
ECHO SCANDISK DID NOT FINISH! TRY AGAIN!
:EXIT
```

End

and the other codes (1, 2, 3, and 4) mean that ScanDisk didn't finish for one reason or another. SCCUSTOM.BAT shows a simple ScanDisk maintenance file.

Customizing ScanDisk

ScanDisk is one of MS-DOS's most easily learned commands. Just type the command SCANDISK with no parameters or switches, and ScanDisk will take you by the hand and guide you step-by-step through a complete test of your disk drives. You also can customize a ScanDisk session. You can invoke a number of command switches that let you reduce the amount of interaction ScanDisk demands, even to the point of letting it run unattended. (See the table "ScanDisk Switches.") For example, use this command to tell ScanDisk to fix any errors it discovers and to scan for surface defects without hesitation:

```
SCANDISK /AUTOFIX /SURFACE
```

If these command-line switches aren't automated enough, you can roll up your sleeves and edit the SCANDISK.INI file, which contains various ScanDisk settings. Editing SCANDISK.INI is not for the fainthearted, but it does let you customize nearly every aspect of ScanDisk's operation.

SCANDISK.INI contains two groups of settings. The first

group, called the Environment Section, affects the general operation of ScanDisk, such as whether or not it displays color or supports the mouse. The other group, the Custom Section, contains settings that are in effect only if you include the /CUSTOM switch on the ScanDisk command line, like this:

```
SCANDISK /CUSTOM
```



BE MORE EFFICIENT

If you find yourself frequently using a command such as the following at the DOS prompt:

```
TYPE filename.ext | MORE
```

you may want to save a few keystrokes by using this command instead:

```
MORE < filename.ext
```

Both commands display the contents of a file on screen, one page at a time. If you don't have a bias against creating small batch files, you can improve efficiency still further by creating a short batch file called M.BAT. It contains just two lines:

```
@ECHO OFF
MORE < %1
```

Then, you won't have to hunt for the pipe (|) or less than (<) key. You can simply type this command to scroll through a file:

```
M filename.ext
```

Don't worry about short files. A file short enough to fit on the screen won't scroll out of view if you use M.BAT to display it.

—Lane Olinghouse

How to Customize Your Keyboard

Swapping Ctrl and Caps Lock or substituting an oft-used but hard to reach Function key for an easier stroke is possible with a Debug assist.

by Robert L. Hummel

Mice, rollerballs, and pens may be all the rage nowadays, but nothing is going to replace the keyboard as the primary way to talk to your computer. The relationship between PC owners and their keyboards may be intimate, but it hasn't always been smooth. The trouble is PC keyboards are somewhat awkward and standards are fickle.

Take the original keyboard introduced with the IBM PC. Remember the tiny Enter and Shift keys? The IBM AT keyboard wasn't much of an improvement. The Esc key had migrated to the top of the numeric keypad, and the ubiquitously used backslash key was stuck between the = key and a shrunken backspace key. IBM's "enhanced" keyboard fattened up the Enter, backspace, and Shift keys, but swapped the Ctrl key to the bottom row of

the keyboard, substituting Caps Lock in its place.

The trouble with altering these "standards" is that a person's typing habits are hard to break. What of the unwitting user who expects to find the Ctrl key at the end of the "home row" on the keyboard?

Furthermore, hardware design is not the only culprit when it seems as if you need two left hands to work a program. Software and software designers share the blame. That's why I wrote these three short Debug scripts that can help you get comfortable with a keyboard. Whether you want to restore your Ctrl key, redefine a key's assignment, or swap two key functions, you'll find these programs a handy addition to your toolbox.

For Ctrl Freaks Only

Shortly after IBM introduced its 101-key enhanced keyboard, a collective cry of angst (registering 6.8 on the Richter scale) erupted from WordStar word processor owners, outraged at the loss of the convenient Ctrl key, a key required to work their touch-typing magic. And, though the original WordStar

has (thankfully) disappeared, this Ctrl-key fixation persists. Fortunately, switching the Caps Lock and left Ctrl keys isn't difficult once you understand how the keyboard works.

Each time a key is pressed or released, the keyboard generates a signal called an interrupt. This gets the CPU's attention, and executes a program in the PC's BIOS (Basic Input/Output System) that translates the key's particular code into an action. This action may include changing a keyboard state, such as Caps Lock, setting a "key is pressed" flag such as Alt, or putting a character in the keyboard buffer where applications can access it.

In the IBM PC, XT, and early versions of the AT, any program could look at the key's code, but couldn't change it. This shortcoming was addressed in later editions of the machine's BIOS with the addition of a new function: the keyboard intercept.

The keyboard intercept ensures that before the key code is processed by the BIOS, it is broadcast to any program that cares to intercept it.

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Thus, a program can monitor, cancel, and change keystrokes before they are processed.

This is how the CAPSCTRL program works. It monitors the keyboard looking for the codes that belong to the Caps Lock and left Control keys. Anytime one is found, it is swapped for the other. All the complicated work is left completely to the PC's BIOS.

To convert the CAPSCTRL.SCR Debug script to an executable program, see the sidebar "Processing Debug Scripts." Once you've created CAPSCTRL.COM, simply run the program at the DOS command line to swap the functions of the Caps Lock and the left Ctrl keys. Note that the right Ctrl key is unaffected by the swap.

Behavior Modification

As I said, some keyboard problems aren't related to hardware design. Sometimes it's just bad programming. That's the case with a popular piece of software I use. The program's author decided that the most intuitive key combination for erasing an entry would be Ctrl-W (W for wipeout, I guess).

My fingers disagree. No matter

how many times I try to type Ctrl-W, I find myself hitting the Esc key instead. After all, cancelling an entry is one of the Esc key's universally recognized functions.

Now, the program's author wasn't about to change his application just to suit me. So I decided that the easiest way to solve this problem was to fool the software into working the way I did by making Esc generate Ctrl-W. I wrote the KEYSUB program to accomplish this.

KEYSUB works through the keyboard BIOS and so is restricted to key combinations that are normally recognized by the keyboard. In other words, special keys such as Caps Lock or crazy combinations like left Ctrl-right Shift-left Alt-F12 can't be processed. A key has to be defined and recognized by the BIOS before you can redefine it.

(How do you tell what keys are valid? If you type an unrecognized key combination in response to KEYSUB's prompts, the program will simply ignore it.)

KEYSUB redefines a single keyboard combination, giving it a new value. A combination is almost any key that is usually coupled with

one of the Shift, Alt, or Ctrl keys.

After you create KEYSUB.COM, execute it by typing KEYSUB at the command line. The program will display the following prompt:

Press key to redefine

Press the key you wish to redefine. In my example, the key I wanted to redefine was the Esc key, so I'd press that key once. Remember, none of these keystrokes will display, so don't be alarmed. Without pressing Enter the program continues and presents a second prompt:

Press new value

At this point, you must enter the keystrokes that will be the first key's new value. In my example, I'd hold the Ctrl key and type the W key once. (These keystrokes are not echoed to the screen either.) The program then terminates and returns control to DOS. From that point on, every time I press the Esc key, the PC (and the particular application that's running) reacts as if I'd entered a Ctrl-W.

KEYSUB.COM is useful in other

CAPSCTRL.SCR creates the CAPSCTRL.COM program that swaps the functions of the left Ctrl and Caps Lock keys on your keyboard.

N CAPSCTRL.COM

A 100

JMP 13F

DB 0

CMP AL,E0

JNZ 10E

CS:

INC BY [102]

JMP 13A

CS:

CMP BY [102],0

JZ 11D

CS:

DEC BY [102]

JMP 13A

PUSH AX

AND AL,7F

CMP AL,3A

JNZ 12C

POP AX

AND AL,80

OR AL,1D

STC

JMP 13A

CMP AL,1D

JNZ 138

POP AX

AND AL,80

OR AL,3A

STC

JMP 13A

CLC

POP AX

JMP 0:0

MOV AX,3515

INT 21

MOV [13B],BX

MOV [13D],ES

MOV AX,2515

MOV DX,103

INT 21

MOV AH,49

MOV ES,[2C]

INT 21

MOV DX,13F

INT 27

RCX

61

W

Q

End

places as well. Let's say that every time you try to type a multiple letter abbreviation it winds up looking like U>S>A> or P>O>BOX because you hold down the Shift key while you type. You decide to remap the ">" key to produce "." to eliminate the problem. However, you can't do without the > key occasionally, so you decide to put it in the spot occupied by the "~" key. You'd first call KEYSUB.COM; at the prompt, "press key to redefine," enter ~; then at the next prompt, "press new value," type: >. (Just as above, none of these keystrokes are echoed to the screen.)

Since you are swapping values, you'd make another call to KEYSUB.COM. At the prompt, "press key to redefine," type: >; then, at the prompt, "press new value," type: .

The first line tells KEYSUB to monitor the keyboard for the "~" character and, if found, substitute the ">" character. Similarly, the second line will look for ">" and substitute the "." character.

At first glance, you might see a problem with these assignments. It looks as though if you type a "~," the first copy of KEYSUB will change it to a ">," and the second copy will see the ">" and change it to a ".". But this doesn't happen. The last copy of KEYSUB to be loaded is the copy that gets to examine the characters coming from the keyboard first. Thus the ">" character pro-

KEYSUB.SCR creates the KEYSUB.COM program that enables you to reassign a key to have a new meaning.

N KEYSUB.COM

A 100

JMP 158

DW 0,0

STI

PUSH BX

PUSH AX

PUSHF

CALL 0:0

POP BX

PUSHF

CMP BH,1

JBE 120

CMP BH,10

JZ 120

CMP BH,11

JNZ 12B

CS:

CMP AX,[102]

JNZ 12B

CS:

MOV AX,[104]

POPF

POP BX

RET 2

DB "Press key to redefine\$"

DB D,A

DB "Press new value\$"

MOV BH,10

MOV AX,12FF

INT 16

CMP AL,FF

JNZ 165

SUB BH,BH

MOV DI,102

CLD

MOV CX,2

MOV DX,130

MOV AH,9

INT 21

MOV AH,BH

INT 16

STOSW

MOV DX,146

LOOP 16F

MOV AX,3516

INT 21

MOV [10B],BX

MOV [10D],ES

MOV AX,2516

MOV DX,106

INT 21

MOV AH,49

MOV ES,[2C]

INT 21

MOV DX,130

INT 27

RCX

9F

W

Q

End

duced by the first copy of KEYSUB when you press "~" is never seen by the subsequently loaded copy. Beware, however: You accidentally can create key loops that chain.

Trading Places

The KEYSUB program redefines a

key, but does nothing to preserve the key's previous value. This is satisfactory if you just want to change the way that a particular key works. However, there are times you may want to exchange two keys, forcing them to swap identities.

PROCESSING DEBUG SCRIPTS

To create any of these keyboard helper programs, you must first create the corresponding Debug script files shown in the program listings. Using DOS's Edit or an editor that saves files in ASCII format, type the instructions in the listing exactly as shown. Press the Enter key after each line, especially the Q in the last line. Also, be certain to enter a blank line just before the RCX instruction by pressing Enter twice. When you're done, save the file under the appropriate name and exit your editor.

Once you verify that you've created the file correctly, you must make sure that Debug is in your current directory or in a directory listed in your PATH statement. Then create the executable program by typing the following command at the DOS prompt:

DEBUG < PROGRAM.SCR

where PROGRAM.SCR is the file you created with your editor. This command tells DOS to execute Debug and take its input from the SCR file instead of from the keyboard. When Debug encounters the Q instruction in the last line of the file, it terminates and returns control to DOS. If all goes well, you'll have created the program's executable COM file.

To make use of your new program, copy the COM file to the directory in which you store your batch or utility programs or into your DOS directory so that it will be available to you at the command line.

—R.L.H.

KEYSWAP.SCR creates the **KEYSWAP.COM** program that exchanges the effects of two keys.

```

N KEYSWAP.COM
A 100
JMP 160
DW 0,0
STI
PUSH BX
PUSH AX
PUSHF
CALL 0:0
POP BX
PUSHF
CMP BH,1
JBE 120
CMP BH,10
JZ 120
CMP BH,11
JNZ 138
CS:
CMP AX,[102]
JNZ 120
CS:
MOV AX,[104]
JMP 138
CS:
CMP AX,[104]
JNZ 138
CS:
MOV AX,[102]
POPF
POP BX
RETF 2
DB "Press first key$"
DB D,A
DB "Press second key$"

MOV BH,10
MOV AX,12FF
INT 16
CMP AL,FF
JNZ 160
SUB BH,BH
MOV DI,102
CLD
MOV CX,2
MOV DX,13D
MOV AH,9
INT 21
MOV AH,BH
INT 16
STOSW
MOV DX,14D
LOOP 177
MOV AX,3516
INT 21
MOV [10B],BX
MOV [10D],ES
MOV AX,2516
MOV DX,106
INT 21
MOV AH,49
MOV ES,[2C]
INT 21
MOV DX,13D
INT 27

RCX
A7
W
Q
End

```

line. The program will display the following prompt:

Press first key

Press the first key you wish to swap. The program then continues and displays the prompt:

Press second key

Simply press the second key you want to swap. The program then terminates and returns control to DOS. From that point on, the effects of the two keys will be exchanged, until you reboot your computer.

The Fine Print

Bear in mind that these three programs have some limitations—they're only Debug scripts after all, not commercial keyboard remapping programs.

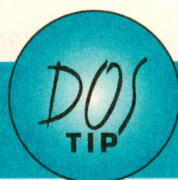
These programs get the key codes they need to perform their jobs directly from the BIOS (that is, your keystroke input) each time you run them. Simply put, this means that you cannot couple them to an AUTOEXEC.BAT file to automate the process. You must reprogram the key assignments each time you turn on your PC. ■

Basic programmers, for example, may find that entering strings would be easier if they swap the single quote (') and double quote (") keys. Are you tired of having to press Shift to type a colon? You could make your life easier by swapping the : and ; keys. And I've made my keyboard movement easier by swapping the Insert/Home and Delete/End key pairs on my cursor pad.

Once you get used to the idea, you may discover a lot of swaps that could improve your productivity. I wrote the KEYSWAP program shown here to address these situations.

KEYSWAP is similar in nature to the KEYSUB program except that it assumes you want to swap the definitions of the two keys you specify. After you create KEYSWAP.COM

from KEYSWAP.SCR, execute it by typing KEYSWAP at the command



ALL THE WRITE STUFF

One important safety enhancement Microsoft included in MS-DOS 6.2 was the addition of a /X switch that disables SMARTDrive's write-back feature. Ordinarily, SMARTDrive (SMARTDRV.EXE) caches disk writes, writing them back to disk periodically. Although this reduces the number of disk accesses and thus speeds disk operations, it also can cause data loss. If, for instance, you lose power before SMARTDrive writes the contents of the cache to disk, you'll lose important data.

When it added /X, Microsoft also changed the DOS installation program, Setup. Now, when Setup adds a SMARTDRV command to your AUTOEXEC.BAT file, it uses the /X switch. So far so good, right? Not quite. If your AUTOEXEC.BAT file already has a SMARTDRV command, Setup leaves it alone.

The solution? If you want to disable write caching, add the /X switch to the SMARTDRV command in AUTOEXEC.BAT.

—Doug Lowe

B A T C H - F I L E M E D I C

What FOR-IN-DO Can Do for You

This DOS batch-file command helps you shrink dozens of separate command lines down to just a few. But saving keystrokes is only one of its benefits.

by Hardin Brothers

The DOS batch-file language has often been criticized as being weak and limited. Even simple tasks, like displaying an errorlevel value, seem to take Herculean programming efforts. And the resulting batch files often seem cryptic.

Hidden away in the list of batch-file commands is a notable exception, a true time-saver called FOR-IN-DO. With FOR-IN-DO and a little creativity, you often can accomplish in a line what would otherwise take dozens, or sometimes hundreds, of separate commands.

I received an E-mail note this month from Joan Sherman asking for a general explanation of FOR-IN-DO, along with some examples of how to use it. Ms. Sherman says she finds FOR-IN-DO both intriguing and confusing. Most batch-file programmers I've met feel the same way.

By the end of this article, however, I hope to change your mind. I'll show you how FOR-IN-DO lets you operate on a group of files all at

once and create a loop in a batch file so you can perform the same task a number of times. I'll explain how the command smooths over uppercase and lowercase requirements in batch files. And I'll give you a batch file that uses FOR-IN-DO to capture and display errorlevels returned from any application, utility, or DOS command.

Keep It Simple

The best way to learn to use FOR-IN-DO is to start with simple examples. (If you are unfamiliar with the syntax, refer to the accompanying sidebar, "The FOR-IN-DO Formula.")

The first example reduces three sets of commands to just one and demonstrates how strings work in the command's "(set)" element—a list of strings or filenames separated by spaces, commas, or semicolons. Note that the double percent sign in the following line indicates the example is to be typed from within a batch file, not at the DOS prompt. To try any of these examples from the command line, just omit one of the percent signs:

```
FOR %%X IN (*.TXT) DO TYPE %%X
```

This line repeats once for every file in the current directory with the extension TXT. Each time the command repeats, the variable %%x contains the name of one of these files. So, if the current directory contains ONE.TXT, TWO.TXT, and THREE.TXT, the line above is equivalent to the commands:

```
TYPE ONE.TXT
TYPE TWO.TXT
TYPE THREE.TXT
```

OK, I'll admit that example isn't terribly exciting. In fact, it is less complex than the one Microsoft uses in its on-line DOS Help:

```
FOR %%F IN (*.TXT *.DOC) DO TYPE %%F
```

This example displays the contents of every TXT and every DOC file in the current directory. Note that all the TXT files are displayed first, followed by all the DOC files.

Unless you have an ancient and slow computer, the last example will send information zipping up your screen. To slow it down, send the text of each file through the MORE filter, like this:

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```
FOR %%F IN (*.TXT *.DOC) DO TYPE
%%F | MORE
```

You can, if you wish, combine filenames and normal text strings in the same FOR-IN-DO command. For example, if you want to generate a list of TXT files with an explanatory header, you could use:

```
FOR %%F IN (FILE_LIST *.TXT) DO
ECHO %%F >> FILELIST.ASC
```

The first line of FILELIST.ASC contains the text "File_List," the first string in the set in the FOR-IN-DO command. This line is followed by a list of the TXT files in the current directory.

You can use FOR-IN-DO to add to the capabilities of the DIR com-

mand, but be careful. It is easy to write a line like this:

```
FOR %%F IN (*.DOC *.TXT) DO DIR
%%F
```

This line will work—sort of. Let's assume you have six DOC files and six TXT files in the current directory. The first iteration of this command will be equivalent to this command:

```
DIR ONE.DOC
```

The next iteration will be equivalent to the following:

```
DIR TWO.DOC
```

In other words, this example will invoke the DIR command 12 times,

and each will display a single file. That's an inefficient use of both FOR-IN-DO and DIR. If you want a list of all DOC and TXT files in the current directory, use either of these two lines instead:

```
FOR %%F IN (*.DOC *.TXT) DO ECHO %%F
```

or:

```
FOR %%F IN (DOC TXT) DO DIR *.*%%F /B
```

You could, of course, take the output from either command and send it through DOS's SORT filter to alphabetize the filenames.

Real-World Examples

One common use of FOR-IN-DO is to execute a command on several files

THE FOR-IN-DO FORMULA

I find it much easier to remember the syntax for this command if I call it FOR-IN-DO, instead of just the FOR command, as it's known in most DOS documentation and manuals. The words *IN* and *DO* are required whenever you use FOR; if you omit them, DOS displays an error message and refuses to execute the command.

You can use FOR-IN-DO from the command line or inside a batch file. At the command line, the syntax is:

```
FOR %C IN (set) DO command [parameters]
```

In a batch file, you have to make only one change. You must use a double percent sign in front of the variable:

```
FOR %%C IN (set) DO command [parameters]
```

The *[parameters]* in both lines are optional, and depend on the command you need to execute. The remainder of each line is mandatory.

Unlike every other DOS and batch-file command, FOR-IN-DO is an "iterated" command, which means that it repeats when it is executed. It can execute only once, but normally repeats or iterates two or more times.

In the %C or %%C portion of the line, the character C is a variable that contains a different value during each iteration of FOR-IN-DO. The variable must be named with a single letter,

from A through Z, in either upper- or lowercase. You cannot use a numeral as the variable name, because percent plus a numeral (%3, for example) is always interpreted as a command-line parameter in a batch file. (However, you can use a numeral as the variable name when you use FOR-IN-DO from the command line.)

The *(set)* is a list of strings or filenames separated by spaces, commas, or semicolons. You must place parentheses around the set, and you cannot use any parentheses inside the set. Finally, the *command* is any DOS or batch-file command, except FOR-IN-DO.

The command in the FOR-IN-DO line is repeated once for every string in the set and for every filename specified or implied in the set. Each time it is repeated, the variable contains the string or filename. For example, the line:

```
FOR %%C IN (A B C) DO ECHO %%C
```

creates three ECHO commands: ECHO A, ECHO B, and ECHO C. If you have 10 batch files in a directory and execute the following command from within a batch file:

```
FOR %%C IN (*.BAT) DO ECHO %%C
```

the command will display the name of each batch file.

—H.B.

at once. Suppose you had a handful of text files you needed to edit. You could edit them manually, one at a time, with commands like this:

```
EDIT ONE.TXT
EDIT TWO.TXT
EDIT THREE.TXT
```

and so on. You also could use FOR-IN-DO from the command line to do the same job more easily:

```
FOR %F IN (*.TXT) DO EDIT %F
```

When you run this command, the DOS EDIT utility appears with each of the TXT files in the current directory. Each time you exit EDIT, it restarts with the next file loaded.

If you would rather do the editing at a later time, you could use almost the same command line to create a batch file.

For example, these two lines typed at the C:\> prompt create a batch file that, when run, operates the DOS EDIT program with each of your text files. The first line is necessary only if you already have a file called EDITALL.BAT in the current directory:

```
DEL EDITALL.BAT
FOR %F IN (*.TXT) DO ECHO EDIT %F
>> EDITALL.BAT
```

Perhaps the most general solution to editing, typing, or deleting multiple files at once is a program that can run any DOS command or program with any combination of files. You can create a batch file, called MULTI.BAT, that can perform any command on any collection of files. You can use the same batch file to run EDIT or any other program multiple times, each with a different file.

The syntax for using MULTI.BAT is simple:

```
MULTI command files
```

that is, the word *Multi* followed by a command word and then a list of

files. The file list, of course, may contain wild cards. For example, to delete all *.BAK and *.BK! files at once, use the batch file this way:

```
MULTI DEL *.BAK *.BK!
```

At first, it may seem that the batch file requires only two lines:

```
@ECHO OFF
FOR %%F IN (%2 %3 %4 %5 %6) DO %1 %%F
```

This batch file will work, but only if you run it correctly, with a command and a list of from one to five filenames. Each filename, of course, may contain wild cards.

A good batch file checks for user errors and allows as much flexibility as possible. This first stab at MULTI.BAT has no error checking and allows only five filenames. Also, we haven't allowed for command parameters; our MULTI.BAT doesn't let the user include DEL /P as a prompt before DOS deletes each file.

If you can solve these problems (and there are several ways), you can create a truly useful MULTI.BAT program. Why not try it? If you have any luck, send your program to me c/o *DOS Resource Guide*.

But first let's look at some other unusual uses of FOR-IN-DO.

A Case Check in Point

Assume you are writing a batch file to format a disk, and to prevent accidental reformatting, you want to let the user format a disk in drive A or B, but not on any other drive. That's a common batch-file task, and one that cries out for help from FOR-IN-DO.

How many ways can a user specify that he or she wants to format the disk in drive A? Four ways come to mind immediately:

```
FORMAT a
FORMAT A
FORMAT a:
FORMAT A:
```

You could have your batch file accept only one of those and reject

the others. But that seems too restrictive. So you might try this:

```
IF "%1"=="a" GOTO DRIVE_A
IF "%1"=="A" GOTO DRIVE_A
```

and so on. With four test lines, you can check for all the possibilities I listed above. But assume 10 or even 20 possibilities exist, and you want to check for them all. If you like to type, you might not balk at typing 20 similar lines. I'd prefer to put all the tests into a single line, whether there are 2 or 20 of them. FOR-IN-DO can handle the task easily:

```
FOR %%c IN (a A a: A:) DO IF
"%1"=="%c" GOTO DRIVE_A
```

At first, this line looks complex. To understand a complicated FOR-IN-DO command, first isolate the command that is repeated for each iteration. In this case:

```
IF "%1"=="%c" GOTO DRIVE_A
```

That doesn't look much more complex than the original tests, except the user's parameter (%1) is being compared to the FOR-IN-DO variable, in this case %c.

When FOR-IN-DO is executed, the user's first parameter is tested against the strings "a", "A", "a:", and "A:", in turn. When one of the tests is successful, the command GOTO DRIVE_A is executed.

If all four fail, the GOTO never happens. Instead, the batch-file processor reads and executes the next line of the file.

Presumably, a FORMAT.BAT program would test first for drive A and, if the test fails, then for drive B with a similar FOR-IN-DO statement. If both tests fail, then it would display an error message and a description of how the batch file should be used.

FOR-IN-DO is also an excellent tool when you are working with error-levels returned from DOS commands or utility programs. The CHOICE command, a utility included

with MS-DOS 6, can be improved with FOR-IN-DO, especially if your batch file presents the user with several choices.

For example, assume a menu displayed on the screen asks for the user's selection this way:

```
CHOICE "YOUR SELECTION " /C:12345
```

Many batch-file programmers would follow that line with five more, something like this:

```
IF ERRORLEVEL 5 GOTO OPTION_5
IF ERRORLEVEL 4 GOTO OPTION_4
```

and so on. With FOR-IN-DO, you can simplify this process and cut down on typing.

You also can store the user's choice in an environment variable so you can use it throughout the batch file, not just in one place. This example stores the user's selection in an environment variable called OPT:

```
CHOICE "YOUR SELECTION " /C:12345
FOR %%X IN (1 2 3 4 5) DO IF
  ERRORLEVEL %%X SET OPT=%%X
```

Now to jump to the correct routine, use this simple command:

```
GOTO OPTION_%OPT%
```

You've used only two lines instead

of five to test for the user's choice, and you've stored that choice for later.

Still More Real-World Uses

You can find many other ways to use FOR-IN-DO, both from the DOS prompt and within batch files. For example, suppose you want to locate a file and you're sure it is in a directory in your PATH setting. FOR-IN-DO can do it this way:

```
FOR %%P IN (%PATH%) DO IF EXIST
  %%P\MYPROG.EXE ECHO FOUND IT IN
  %%P
```

This technique, however, will work only if your PATH setting is relatively short. If it is too long, the entire FOR-IN-DO will be more than 127 characters after the PATH is placed inside the set. DOS will take one look at the long line, shrug, report an error, and refuse to execute the line.

Normally, FOR-IN-DO can execute only a single command, not a group of commands for each file or string. But you can get around that restriction pretty easily by using the CALL command.

For example, if you want to copy a group of files from your hard disk to a floppy disk, check to make sure each arrives safely, and then delete the hard disk version if all is well, you'll have to use more than a sim-

ple FOR-IN-DO command. But the task is easy if you do this:

```
FOR %%F IN (%1 %2 %3 %4 %5) DO
  CALL MOVEIT %%F
```

This starts a new batch file, called MOVEIT, for each file in your original set. Each time MOVEIT is called, it receives the name of a new file as its command-line parameter. You can use the same trick if you want to nest a FOR-IN-DO command inside another.

Finally, one of my favorite batch-file utilities makes heavy use of FOR-IN-DO to capture and display the errorlevel returned from any program or DOS command. Just add the command or program name you want to test to the beginning of the accompanying listing, and then run it. The errorlevel will appear on the screen and also will be stored in the environment.

The FOR-IN-DO Challenge

You can write powerful, succinct batch files by making full use of FOR-IN-DO. The next time you face a batch-file programming problem, try this potent command. You may find that you've solved your problem easily and quickly. When you've learned to utilize all the subtleties of FOR-IN-DO, you'll be a much better batch-file programmer. ■

This batch-file fragment captures an errorlevel returned from any DOS command, utility program, or application. It displays the errorlevel on the screen and saves it in an environment variable called ERROR. You can use these lines when you are testing programs and trying to determine why a DOS command or utility program isn't communicating correctly with your batch files.

```
@ECHO OFF
FOR %%X IN (0 1 2) DO IF ERRORLEVEL %%X00 SET
  ERROR=%%X
IF %ERROR%==2 GOTO ABOVE_200
```

```
FOR %%X IN (0 1 2 3 4 5 6 7 8 9) DO IF ERRORLEVEL
  %ERROR%%X0 SET ERROR1=%ERROR%%X
SET ERROR=%ERROR1%
```

```
FOR %%X IN (0 1 2 3 4 5 6 7 8 9) DO IF ERRORLEVEL
  %ERROR%%X SET ERROR1=%ERROR%%X
SET ERROR=%ERROR1%
GOTO END
```

```
:ABOVE_200
FOR %%X IN (0 1 2 3 4 5) DO IF ERRORLEVEL
  %ERROR%%X0 SET ERROR1=%ERROR%%X
```

```
SET ERROR=%ERROR1%
IF %ERROR%==25 GOTO ABOVE_250
```

```
FOR %%X IN (0 1 2 3 4 5 6 7 8 9) DO IF ERRORLEVEL
  %ERROR%%X SET ERROR1=%ERROR%%X
SET ERROR=%ERROR1%
GOTO END
```

```
:ABOVE_250
FOR %%X IN (0 1 2 3 4 5) DO IF ERRORLEVEL
  %ERROR%%X SET ERROR1=%ERROR%%X
SET ERROR=%ERROR1%
```

```
:END
SET ERROR1=
ECHO ERRORLEVEL IS %ERROR%
```

End

Q B A S I C M E N U B U I L D E R

Menus à la Carte

Today's special: a QBasic program that lets you create and modify colorful batch-file menus without really trying.

by John Wolfskill

Like many batch-file programmers, I was relieved when Microsoft added the CHOICE command to DOS 6.0's batch language. Finally, I thought, creating menus was going to be easy. Soon after writing my first menu with CHOICE, however, I realized that something still was missing. Whenever I wanted to add an application to my menu, I had to make significant changes to the batch file.

To solve this problem, I created QBMENU.BAS, a QBasic utility that prompts you to type in your menu items and the commands for invoking them, then creates a batch file from the data you provide. If you need to edit a menu created earlier, you simply run QBMENU again, make the necessary changes in the program's data-entry screen, and save the revised menu. You may change a menu's color scheme by answering a few on-screen prompts.

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Getting Started

Because MENU.BAS's color capability relies on DOS's ANSI.SYS program, your first step should be ensuring that ANSI.SYS is loaded during start-up. If your current CONFIG.SYS doesn't invoke ANSI.SYS, add this line to the file:

```
DEVICE=C:\DOS\ANSI.SYS
```

(If ANSI.SYS resides in a directory other than C:\DOS, change the command accordingly.) Then, press Ctrl-Alt-Del to restart your computer and activate ANSI.SYS.

Next, start the QBasic editor and begin typing in the listing. To save your work, press Alt-F to highlight the Save option, name your file QBMENU.BAS, then press Enter to save the file to disk. Continue saving your work as you type in the remainder of the listing.

To run the program, press Shift-F5; QBMENU immediately writes a small data file called MM.DAT to the current directory. This file contains the default menu items and optional parameters (more about these settings later).

Afterwards, a display appears

(see photo of Opening Display). The leftmost column, which contains the letters A through L, labels the 12 menu entries. You must supply two pieces of information for each menu entry: the prompt you want in the batch menu and the command used to carry out the specified action.

Entering Data

To start filling in the blanks, press E to enter text-entry mode. A flashing cursor appears within a highlighted bar. The first time you run QBMENU, a tilde (~) appears in the leftmost position of each of the 12 menu-entry fields. This character marks the field as empty. Because QBMENU ignores blank items when it creates your batch menu, you must type over the tilde when filling in a menu entry.

To fill in menu item A, position the cursor over the tilde in the top-most field, and type the message you want to appear in the menu. If, for example, you want selection A to start Windows, you might type START MICROSOFT WINDOWS.

To fill in the command for this entry, press the Tab key to move the cursor to the adjacent field.

Then, type in a command such as this one:

```
C:\WINDOWS\WIN
```

(Including a full pathname is required, and helps DOS find the program without having to search through the directories listed in your PATH command.) The command you supply may include switches or filenames, as this one does:

```
C:\PW\PW.COM /C MYFILE.TXT
```

Press Tab to return the highlight bar to the menu-item field and press the down-arrow key or Enter to highlight item B. Continue adding menu items and commands until all the options you want your batch file to display are listed. (It's best to work from top to bottom, being sure not to leave blank lines between entries.) When you're through, press Esc to exit text-entry mode.

Because your batch menu must provide a means of exiting to the DOS prompt, QBMENU automatically adds an Exit option to the end of your list. For example, if the last item in your list is item D, QBMENU adds Exit as item E when it writes the batch file to disk.

To delete an item, press *E* (if you aren't in text-entry mode), move the highlight bar to the desired menu item, press Home to move the cursor to the field's leftmost character, and press the tilde key to overwrite the first character in the item name. After pressing Esc to exit text-entry mode, press *P* to activate the Purge option. QBMENU deletes the unwanted item and its associated command, then rearranges the remaining items to fill the gap.

Looks Do Count

Next you must tell QBMENU how

Menu Item	Command for Menu Item
A ~	
B ~	
C ~	
D ~	
E ~	
F ~	
G ~	
H ~	
I ~	
J ~	
K ~	
L ~	
	<E>dit
	<O>ptions
	<C>reate
	<P>urge
	<S>ave and Quit
	<A>bandon

Opening Display. QBMENU.BAS's opening screen is a data-entry form into which you type your menu's screen prompts and the pathnames that help DOS find and load the listed applications.

you want your menu to look: the menu's title, the message used to prompt users to make a selection, foreground and background colors for text, the screen's background color, and the type of box in which the menu is displayed. You also control how long the program waits before making a selection and which menu entry is the default selection.

To see how this part of QBMENU works, press the letter *O* to choose Options from the menu bar at the bottom of the display. The program lists the numbers zero through seven, indicating which color corresponds to each value. Then, the program displays a series of prompts, pausing for you to respond after each one (see the illustration on page 47).

Press Enter to accept the current text or value, or type in new text or a new value and press Enter.

The border-preference option controls the boxing method used to

```
Applications Menu
(A) Start Signature
(B) Start Lotus 1-2-3
(C) Start Windows
(D) Start Bitcon
(E) Exit

Select a Menu Item:
```

Sample Menu. Here's what a sample menu based on QBMENU.BAS's default settings would look like.

display your menu. If you choose *Y*, QBMENU displays the entire menu in a framed box. If you choose *N*, each menu item appears in its own box; the boxes aren't framed.

When choosing a timeout value, you must supply a value between zero and 99 seconds. A value of zero tells the batch file to display the menu on screen until the user makes a selection. If you specify any other permissible value and no choice is made before the stated time elapses, the batch file selects the default menu entry. If you want the program to select the Exit op-

(Article continues on page 46)

QBMENU.BAS is a QBasic utility that makes it easy to build and modify a menu that gives you single-key access to your favorite applications.

```

DEFINT A-Z
ON ERROR GOTO TESTERROR
COLOR 15, 1: CLS
' - Initialize string and integer arrays -
DIM ITEM$(6 TO 17), PATHNAME$(6 TO 17),
    APPNAME$(6 TO 17), DIRPATH$(6 TO 17)
DIM NEWITEM$(13), NEWPATHNAME$(13),
    NEWAPPNAME$(13), NEWDIRPATH$(13), RCOL(13)
' - Set Up internal string variables -
COLOR$ = "      0=Black 1=Red 2=Green 3=Yellow
4=Blue 5=Magenta 6=Cyan 7=White  "
ESC$ = "ECHO " + CHR$(27) + "[": NUM$ =
    "ABCDEFGHIJKL"
TOPBAR$ = CHR$(201) + STRING$(60, 205) +
    CHR$(187)
SIDEBAR$ = CHR$(186) + STRING$(60, 32) +
    CHR$(186)
BOTTOMBAR$ = CHR$(200) + STRING$(60, 205) +
    CHR$(188)
INDENT$ = STRING$(6, 32)
MESSAGE$(1) = " <E>dit <O>ptions <C>reate
<P>urge <S>ave and Quit <A>bandon  "
MESSAGE$(2) = " <TAB> Change Fields
<Up><Dn><ENTER> Next Item
<ESC> Exit  "
UK$ = CHR$(0) + CHR$(72) 'Cursor up
DK$ = CHR$(0) + CHR$(80) 'Cursor down
LK$ = CHR$(0) + CHR$(75) 'Cursor left
RK$ = CHR$(0) + CHR$(77) 'Cursor right
HOME$ = CHR$(0) + CHR$(71) 'Home cursor
END$ = CHR$(0) + CHR$(79) 'End cursor
' - Establish the default batch file data -
GOSUB BLANKALL

DOSBACKCOLOR$ = "0" 'Black screen background
DOSTEXTCOLOR$ = "7" 'White text
DOSFILLCOLOR$ = "4" 'on a blue background
TIMEOUT$ = "20" '20-second default timeout
TIMEITEM$ = "A" 'Default item is A
BATCHNAME$ = "MENU.BAT" 'Default name of
    'batch file
BATCHPATH$ = "C:\\" 'Default path for batch file
TITLE$ = "Applications Menu" 'Default menu
    'title
PROMPT$ = "Select a Menu Item" 'Default menu
    'prompt
BORDER$ = "1" 'Graphics border enabled

' - Load current batch file data from disk -
9999 OPEN "MM.DAT" FOR INPUT AS #1

FOR CLNE = 6 TO 17
    INPUT #1, PATHNAME$(CLNE)
    IF LEFT$(PATHNAME$(CLNE), 1) <> "-" THEN
        GOSUB PARSE
    INPUT #1, ITEM$(CLNE)
NEXT

INPUT #1, DOSBACKCOLOR$
INPUT #1, DOSTEXTCOLOR$

```

```

INPUT #1, DOSFILLCOLOR$
INPUT #1, TIMEOUT$
INPUT #1, BORDERS$
INPUT #1, TIMEITEM$
INPUT #1, BATCHNAME$
INPUT #1, BATCHPATH$
INPUT #1, TITLE$
INPUT #1, PROMPT$
CLOSE 1

```

```

' - Routine draws the program screen -
GETPIC:
    COLOR 0, 15
    LOCATE 2, 10: PRINT STRING$(60, 32);
    LOCATE 2, 22: PRINT "DOS Resource Guide Batch
        File Menu Maker"
    LOCATE 4, 5: PRINT STRING$(72, 32)
    LOCATE 4, 15: PRINT "Menu Item"
    LOCATE 4, 42: PRINT "Command for Menu Item"
    COLOR 15, 0

```

```

FOR J = 6 TO 17
    LOCATE J, 5: PRINT ITEM$(J);
    LOCATE J, 30: PRINT PATHNAME$(J);
NEXT

```

```
SPOS = 1
```

```

FOR LNE = 6 TO 17
    LOCATE LNE, 2: PRINT MID$(NUM$, SPOS, 1);
    SPOS = SPOS + 1
NEXT

```

```
MESSAGE = 1: GOSUB MESSAGEBAR 'Displays main menu
```

```
' - Routine accepts keyboard input for main menu -
```

```
GETKEYS:
```

```
DO
```

```

X$ = INKEY$
X$ = UCASE$(X$)

```

```
SELECT CASE X$
```

```
CASE "O" 'Select batch file options
```

```
GOSUB OPTIONS: GOSUB MENUBAR
```

```
MESSAGE = 1: GOSUB MESSAGEBAR
```

```
CASE "E" 'Edit item strings and DOS pathnames
```

```
ACTION = 1: MESSAGE = 2: GOSUB MESSAGEBAR
```

```
GOSUB ASSIGN
```

```
MESSAGE = 1: GOSUB MESSAGEBAR
```

```
CASE "A" 'Abandon the changes
```

```
GOSUB SAVEFILE: CLS : SYSTEM
```

```
CASE "S" 'Save the data and quit
```

```
GOSUB SAVEFILE: CLS : SYSTEM
```

```
CASE "C" 'Create a DOS batch file
```

```
GOSUB PURGE: GOSUB MAKEBATCH: GOTO GETPIC
```

```
CASE "P" 'Purge blank entries from list
```

```
GOSUB PURGE
```

```
CASE ELSE
```

```
END SELECT
```

```
LOOP
```

```
' - Routine edits prompt/pathname strings -
```

```
ASSIGN:
```



```

MAXLNE = 17: MINLNE = 6: CLNE = MINLNE

ASSIGN1:
IF ACTION = 1 THEN MAXPOS = 26: MINPOS = 5
IF ACTION = 2 THEN MAXPOS = 76: MINPOS = 30
CPOS = MINPOS: LOCATE MINLNE, MINPOS: GOSUB
  GATHER
COLOR 0, 15: LOCATE MINLNE, MINPOS: GOSUB GATHER

MOVECUR:
DO
  X$ = INKEY$
  SELECT CASE (X$)
    CASE ""
      GOSUB FLASH

CASE CHR$(13)
  IF CLNE < MAXLNE THEN
    COLOR 15, 0: GOSUB GATHER
    CLNE = CLNE + 1: CPOS = MINPOS
    COLOR 0, 15: GOSUB GATHER
  END IF

CASE CHR$(27)
  GOSUB GATHER: RETURN

CASE UK$
  IF CLNE > MINLNE THEN
    COLOR 15, 0: GOSUB GATHER
    CLNE = CLNE - 1
    COLOR 0, 7: GOSUB GATHER
  END IF

CASE DK$
  IF CLNE < MAXLNE THEN
    COLOR 15, 0: GOSUB GATHER
    CLNE = CLNE + 1
    COLOR 0, 15: GOSUB GATHER
  END IF

CASE LK$
  IF CPOS > MINPOS THEN CPOS = CPOS - 1

CASE RK$
  IF CPOS < MAXPOS THEN CPOS = CPOS + 1

CASE CHR$(8)
  IF CPOS > MINPOS THEN
    COLOR 0, 15: LOCATE CLNE, CPOS: PRINT " ";
    : COLOR 15, 0
    CPOS = CPOS - 1
  END IF

CASE CHR$(9)
  COLOR 15, 0: GOSUB GATHER
  IF ACTION = 1 THEN ACTION = 2 ELSE ACTION = 1
  GOTO ASSIGN1

CASE HOME$
  LOCATE CLNE, MINPOS: CPOS = MINPOS

```

```

CASE ENDS
  LOCATE CLNE, MAXPOS: CPOS = MAXPOS

CASE CHR$(32) TO CHR$(127)
  COLOR 0, 15: LOCATE CLNE, CPOS: PRINT X$; :
  COLOR 15, 0
  IF CPOS < MAXPOS THEN CPOS = CPOS + 1
CASE ELSE
END SELECT

LOOP
' - Routine reads text strings from the screen -
GATHER:

  GATHER$ = ""

  FOR NPOS = MINPOS TO MAXPOS
    GATHER$ = GATHER$ + CHR$(SCREEN(CLNE, NPOS))
  NEXT

  LOCATE CLNE, MINPOS
  IF ACTION = 1 THEN ITEM$(CLNE) = GATHER$
  IF ACTION = 2 THEN PATHNAME$(CLNE) = GATHER$
  IF LEFT$(PATHNAME$(CLNE), 1) <> "~" THEN GOSUB
    PARSE
  PRINT GATHER$;
  RETURN
' - Routine sets item/pathname arrays to default
' values -
BLANKALL:
  FOR J = 6 TO 17
    PATHNAME$(J) = STRING$(47, 32)
    ITEM$(J) = "~" + STRING$(21, 32)
    APPNAME$(J) = ""
    DIRPATH$(J) = ""
  NEXT
  RETURN
' - Routine separates DOS pathname from
' application name -
PARSE:
  APPNAME$(CLNE) = ""
  QQ = LEN(PATHNAME$(CLNE))

  FOR J = QQ TO 1 STEP -1
    IF MID$(PATHNAME$(CLNE), J, 1) = "\" THEN
      IF J = Q THEN EXIT FOR
      APPNAME$(CLNE) = RIGHT$(PATHNAME$(CLNE), QQ - J)
      DIRPATH$(CLNE) = LEFT$(PATHNAME$(CLNE), J - 1)
      EXIT FOR
    END IF
  NEXT

  RETURN
' - Routine flashes the cursor -
FLASH:
  FL$ = CHR$(SCREEN(CLNE, CPOS))
  COLOR 15, 0: LOCATE CLNE, CPOS: PRINT CHR$(219);
  GOSUB PAUSE
  COLOR 0, 15: LOCATE CLNE, CPOS: PRINT FL$;
  GOSUB PAUSE
  RETURN

```



```
' - Pause timer -
PAUSE:
  T! = TIMER: WHILE T! = TIMER: WEND: RETURN
'- Routine clears the text scroll area -
MENUBAR:
  COLOR 15, 0
  FOR LNE = 19 TO 25
    LOCATE LNE, 1: PRINT STRING$(80, 32);
  NEXT
  RETURN

'- Routine displays the main menu -
MESSAGEBAR:
  COLOR 0, 15: LOCATE 22, 4: PRINT
    MESSAGE$(MESSAGE); : COLOR 15, 0
  RETURN

'- Routine saves the menu data to disk for later
' use-
SAVEFILE:
  OPEN "MM.DAT" FOR OUTPUT AS #1

  FOR J = 6 TO 17
    WRITE #1, PATHNAME$(J)
    WRITE #1, ITEM$(J)
  NEXT

  WRITE #1, DOSBACKCOLOR$
  WRITE #1, DOSTEXTCOLOR$
  WRITE #1, DOSFILLCOLOR$
  WRITE #1, TIMEOUT$
  WRITE #1, BORDER$
  WRITE #1, TIMEITEM$
  WRITE #1, BATCHNAME$
  WRITE #1, BATCHPATH$
  WRITE #1, TITLE$
  WRITE #1, PROMPT$

  CLOSE 1
  RETURN

'- Routine removes blank items from list -
PURGE:
  TT$ = "": MENUITEMS = 0

  FOR J = 6 TO 17 'Removes blank items from the list
    IF LEFT$(ITEM$(J), 1) <> "-" THEN
      MENUITEMS = MENUITEMS + 1
      NEWITEM$(MENUITEMS) = ITEM$(J)
      NEWPATHNAME$(MENUITEMS) = PATHNAME$(J)
      NEWAPPNAME$(MENUITEMS) = APPNAME$(J)
      NEWDIRPATH$(MENUITEMS) = DIRPATH$(J)
      TT$ = TT$ + CHR$(64 + MENUITEMS) 'Creates
        'the CHOICE key list
    END IF
  NEXT

  GOSUB BLANKALL: COLOR 15, 0

  FOR J = 1 TO MENUITEMS
    ITEM$(J + 5) = NEWITEM$(J)
    PATHNAME$(J + 5) = NEWPATHNAME$(J)
    APPNAME$(J + 5) = NEWAPPNAME$(J)
    DIRPATH$(J + 5) = NEWDIRPATH$(J)
  NEXT
```

```
MENUITEMS = MENUITEMS + 1 'Increment no. of items
NEWITEM$(MENUITEMS) = "Exit" 'Add exit-to-DOS item
TT$ = TT$ + CHR$(64 + MENUITEMS) 'Create CHOICE
  ' key list
```

```
FOR J = 6 TO 17
  LOCATE J, 5: PRINT ITEM$(J);
  LOCATE J, 30: PRINT PATHNAME$(J);
NEXT
```

```
RETURN
```

```
' - Error Handler -
```

```
TESTERROR:
```

```
IF ERR > 23 AND ERR < 28 OR ERR = 68 THEN
  RESUME NEXT
```

```
' - Create a new data file, if none exists -
```

```
IF ERL = 9999 THEN
```

```
  IF ERR = 53 THEN GOSUB SAVEFILE: RESUME 9999
END IF
```

```
CLS : PRINT "Error "; ERR; " in line "; ERL; :
  CLOSE : END
```

```
'- Routine selects colors and timeout values -
```

```
OPTIONS:
```

```
GOSUB MENUBAR
```

```
LOCATE 18, 1: COLOR 0, 15: PRINT COLOR$; :
  COLOR 15, 0
```

```
LOCATE 20, 1: VIEW PRINT 20 TO 24
```

```
TITLE:
```

```
PRINT : PRINT "Current menu title is: "; TITLE$
PRINT "Type a new title (55 or fewer
  characters) "; : INPUT TL$
```

```
IF LEN(TL$) > 55 THEN
  BEEP: PRINT "Title too long...Retry"
  FOR J = 1 TO 30: GOSUB PAUSE: NEXT
  GOTO TITLE
END IF
```

```
IF TL$ <> "" THEN TITLE$ = LTRIM$(RTRIM$(TL$))
```

```
PROMPT:
```

```
PRINT : PRINT "Current prompt string is: ";
```

```
PROMPT$
```

```
PRINT "Type a new prompt string (55 or fewer
  characters)"; : INPUT PT$
```

```
IF LEN(PT$) > 55 THEN
```

```
  BEEP: PRINT "Prompt string too long ..Retry"
  FOR J = 1 TO 30: GOSUB PAUSE: NEXT
  GOTO PROMPT
END IF
```

```
IF PT$ <> "" THEN PROMPT$ = LTRIM$(RTRIM$(PT$))
  + " ?"
```

```
PRINT : PRINT "Current screen background color
  is: "; DOSBACKCOLOR$
```

```
INPUT "Enter a new screen background color (0-
```



```

7)"; DBC$
IF DBC$ <> "" THEN DOSBACKCOLOR$ = DBC$

PRINT : PRINT "Current text foreground color
is: "; DOSTEXTCOLOR$
INPUT "Enter a new text foreground color (0-
7)"; DTC$
IF DTC$ <> "" THEN DOSTEXTCOLOR$ = DTC$

PRINT : PRINT "Current text background color
is: "; DOSFILLCOLOR$
INPUT "New text background color (0-7)"; DFC$
IF DFC$ <> "" THEN DOSFILLCOLOR$ = DFC$

IF BORDER$ = "1" THEN OLDYN$ = "Yes" ELSE
OLDYN$ = "No"

PRINT : PRINT "Current border preference is: ";
OLDYN$
INPUT "Do you want a graphics menu border
(y/n)"; YN$
IF UCASE$(YN$) = "Y" THEN BORDER$ = "1"
IF UCASE$(YN$) = "N" THEN BORDER$ = "0"

PRINT : PRINT "Current menu timeout is: ";
TIMEOUT$; " seconds"
INPUT "Enter a new timeout value (0-99 seconds
0=No timeout)"; TMO$
IF TMO$ <> "" THEN TIMEOUT$ = TMO$

PRINT : PRINT "Current timeout item is: ";
TIMEITEM$
PRINT "Enter a new timeout item (A-L)"; : INPUT
TI$
IF TI$ <> "" THEN TIMEITEM$ = TI$

VIEW PRINT: GOSUB MENUBAR: RETURN
'- Routine creates batch file from menu data -
MAKEBATCH:

```

```

QQ$ = CHR$(64 + MENUITEMS)

IF LEFT$(TIMEITEM$, 1) > QQ$ THEN
BEEP: GOSUB MENUBAR: LOCATE 23, 1
PRINT " Default timeout item invalid. Max.
allowable letter is " + QQ$
FOR J = 1 TO 100: GOSUB PAUSE: NEXT
GOSUB MENUBAR
RETURN
END IF

GOSUB MENUBAR
ITEMROW = (25 - MENUITEMS) / 2 'Assign screen
'row

FOR J = 1 TO MENUITEMS 'Calculate
'screen coordinates
NEWITEM$(J) = "(" + CHR$(64 + J) + ")" " +
NEWITEM$(J)
RCOL(J) = (80 - LEN(NEWITEM$(J))) / 2
'Assign screen column

```

```

NEXT

ITEMCOLUMN = 40 'Default is center of screen

FOR J = 1 TO MENUITEMS 'Find leftmost column
'for entire menu block
WORKINGCOLUMN = RCOL(J) 'by checking the
'length of each item
IF WORKINGCOLUMN < ITEMCOLUMN THEN
ITEMCOLUMN = WORKINGCOLUMN
ITEMLENGTH = LEN(NEWITEM$(J))
END IF
NEXT

IF ITEMCOLUMN < 2 THEN ITEMCOLUMN = 2 'Check
'for out-of-range columns
TITLECOLUMN = (80 - LEN(TITLE$)) / 2 'Center
'title over menu
VIEW PRINT 20 TO 24 'Set text scroll box -

BATCH:
CLS : PRINT "Current batch filename is: ";
BATCHNAME$
PRINT "Enter new filename, omitting file
extension"; : INPUT BN$

IF INSTR(BN$, ".BAT") OR LEN(BN$) > 8 THEN
PRINT "Invalid filename...": BEEP: BEEP: GOTO
BATCH
END IF

IF LEN(BN$) > 1 THEN BATCHNAME$ =
UCASE$(LTRIM$(RTRIM$(BN$))) + ".BAT"

PRINT : PRINT "Current pathname for batch file
is: "; BATCHPATH$
PRINT "Enter new pathname for batch file: "; :
INPUT BP$
IF BP$ <> "" THEN BATCHPATH$ = LTRIM$(RTRIM$(BP$))

IF LEN(BATCHPATH$) = 3 THEN 'Removes trailing
'backslash, if present
IF MID$(BATCHPATH$, 3, 1) = "\" THEN DOSMENU$
= BATCHPATH$ + BATCHNAME$
ELSE
DOSMENU$ = BATCHPATH$ + "\" + BATCHNAME$
END IF

'- Create the menu batch file -
PRINT : PRINT "Please wait...Creating " +
DOSMENU$
FOR J = 1 TO 30: GOSUB PAUSE: NEXT

IF TIMEOUT$ <> "0" THEN
CHOICES$ = INDENT$ + "Choice /n /t:" 'Zero
'means no default timeout
T1$ = TIMEITEM$ + "," + TIMEOUT$ + " /c:"
ELSE
CHOICES$ = INDENT$ + "Choice /n"
'Default timeout specified
T1$ = " /c:"

```



```

END IF
OPEN DOSMENU$ FOR OUTPUT AS #1
PRINT #1, INDENT$ + "@ECHO OFF"
PRINT #1, " "
PRINT #1, "REM - DOS RESOURCE GUIDE MENU
PRINT #1, " "
MAKER BATCH FILE - "
PRINT #1, " "
PRINT #1, "REM this batch file requires the
ANSI.SYS driver"
PRINT #1, "REM and a color monitor for
proper operation"
PRINT #1, " "
PRINT #1, ":START"
PRINT #1, INDENT$ + ESC$ + "3" +
DOSTEXTCOLOR$ + "4" + DOSBACKCOLOR$
+ "m"
PRINT #1, INDENT$ + ESC$ + "2J"
PRINT #1, INDENT$ + ESC$ + "3" +
DOSTEXTCOLOR$ + "4" + DOSFILLCOLOR$
+ "m"
PRINT #1, " "
PRINT #1, " "
IF BORDER$ = "1" THEN
PRINT #1, INDENT$ + ESC$ + "3;10H" + TOPBAR$
FOR JJ = 4 TO 20
PRINT #1, INDENT$ + ESC$ + LTRIM$(STR$(JJ))
+ " ;10H" + SIDEBAR$
NEXT
PRINT #1, INDENT$ + ESC$ + "21;10H" +
BOTTOMBAR$
END IF
PRINT #1, " "
PRINT #1, " "
PRINT #1, INDENT$ + ESC$ +
LTRIM$(STR$(ITEMROW - 2)) + " ;" +
LTRIM$(STR$(TITLECOLUMN)) + "H" + TITLE$
FOR J = 1 TO MENUITEMS
IF CHR$(J + 64) = LEFT$(TIMEITEM$, 1) THEN I$
= "*" ELSE I$ = " "
LI$ = NEWITEM$(J) + I$ + STRING$(ITEMLENGTH
- LEN(NEWITEM$(J)), 32)
PRINT #1, INDENT$ + ESC$ +
LTRIM$(STR$(ITEMROW)) + " ;" +
LTRIM$(STR$(ITEMCOLUMN)) + "H" + LI$
ITEMROW = ITEMROW + 1
NEXT
PROMPTCOLUMN = (80 - LEN(PROMPT$)) / 2
PI$ = CHR$(27) + "[" + LTRIM$(STR$(ITEMROW +

```

(Continued from page 41)

The photograph of the sample menu shows the result of QBMENU- BAS's default settings.

When you press C to create your menu batch file in QBMENU, the following program prompts will appear on screen:

Creating the Batch File

Current batch filename is: MENU.BAT
Enter new name for batch file (omit file extension):
Current batch filename is: C:\
Enter new pathname for batch file:

As before, press Enter to accept the current settings, or type in new information and press Enter.

```

1) + " ;" + LTRIM$(STR$(PROMPTCOLUMN)) +
" H " + PROMPT$
PRINT #1, " "
PRINT #1, CHOICE$ + TI$ + TT$ + " " + PI$
FOR J = MENUITEMS TO 1 STEP -1
LTRIM$(STR$(J)); " GOTO ITEM" + CHR$(64
+ J)
NEXT
FOR J = MENUITEMS - 1 TO 1 STEP -1
PRINT #1, " "
PRINT #1, "ITEM" + CHR$(64 + J)
PRINT #1, INDENT$ + ESC$ + "37;40m"
PRINT #1, INDENT$ + ESC$ + "2J"
UCASE$(NEWDIRPATH$(J))
PRINT #1, INDENT$ + "CD " +
UCASE$(NEWAPPNAME$(J))
PRINT #1, INDENT$ + "CD " +
UCASE$(BATCHPATH$)
PRINT #1, INDENT$ + "GOTO START"
NEXT
PRINT #1, " "
PRINT #1, "ITEM" + CHR$(64 + MENUITEMS)
PRINT #1, INDENT$ + ESC$ + "37;40m"
PRINT #1, INDENT$ + ESC$ + "2J"
CLOSE #1
PRINT : PRINT DOSMENU$ + "was created
successfully..."
FOR J = 1 TO 30: GOSUB PAUSE: NEXT
PRINT : PRINT "Add " + DOSMENU$ + " to your
AUTOEXEC.BAT file (Y/N)";
INPUT YN$: PRINT
IF UCASE$(YN$) = "Y" THEN
OPEN LEFT$(BATCHPATH$, 1) + " :AUTOEXEC.BAT"
FOR APPEND AS #1
PRINT #1, "REM DRG MENU MAKER BATCH FILE"
PRINT #1, "CD " + BATCHPATH$
PRINT #1, "CALL " + DOSMENU$
PRINT #1, "CD " + LEFT$(BATCHPATH$, 1) + " :\"
CLOSE #1
PRINT DOSMENU$ + "was added to your
AUTOEXEC.BAT file..."
FOR J = 1 TO 20: GOSUB PAUSE: NEXT
END IF
CLS : VIEW PRINT: RETURN

```

End


```

Current menu title is: Application Menu
Type a new title (55 or fewer characters)

Current prompt string is: Select a Menu Item
Type a new prompt string (55 or fewer characters)

Current screen background color is: 0
New screen background color (0-7)

Current text foreground color is: 7
New text foreground color (0-7)

Current text background color is: 4
New text background color (0-7)

Current border preference is: Yes
Do you want a graphics menu border (Y/N) ?

Current menu timeout is: 20 seconds
Enter a new timeout value (0-99 seconds 0=No timeout)

Current timeout item is: A
Enter a new timeout item (A-L)

```

Prompts. To design the menu, you must answer a series of prompts presented by QBMENU.BAS.

Filenames may contain eight or fewer characters; don't type a file extension.

After creating your customized batch menu, QBMENU displays another prompt:

```
Add MENU.BAT to your AUTOEXEC.BAT
file (Y/N)?"
```

Press **Y** if you want QBMENU to add the name of your batch file to the end of your AUTOEXEC.BAT. Press **N** if you want to start the batch file from the DOS prompt, or you wish to add the entry to your AUTOEXEC.BAT file yourself. If you choose **Y**, remember that QBMENU doesn't search your AUTOEXEC.BAT file to determine if the lines that start MENU.BAT are already there. In subsequent sessions, select **N** to prevent QBMENU from adding the lines to your AUTOEXEC.BAT more than once.

To manually add to AUTOEXEC.BAT the lines that invoke MENU.BAT, load the file into EDIT.COM or another editor that saves files in ASCII format. Then, add the following lines to the end of AUTOEXEC.BAT:

```
CD C:\DOS
CALL MENU.BAT
CD C:\
```

(This assumes that your batch file

is named MENU.BAT and that it resides in your C:\DOS directory.)

After QBMENU writes the batch file to disk, the main menu returns. Press **S** to save the current menu data to disk and exit the program. Press **A** if you want to exit the program without saving the changes you've made.

To view your batch-file menu, exit the QBasic editor and return to the DOS prompt. Log onto the directory where QBMENU stored your batch menu, and then type the name of the batch file. If you're not satisfied with the way the menu looks, run QBMENU again, changing and viewing the results of your alterations until you're happy with it.

QBMENU.BAS is meant to create only one menu, so if you believe you need more than one, you'll need to give the MM.DAT file another name to avoid changing the first menu's parameters when you go to create the second menu. If you want to change the first menu, change its .DAT filename back to MM.DAT. ■

HOW BASIC can you get?

If you have MS-DOS 5 or later, you own QBasic, a version of the most popular programming language in the world. And, as an enthusiast who likes to get down to fundamentals, you've probably written a program or two—be it a quickie dashed off to solve a printing problem or a menu-driven home finance program that took weeks to perfect.

We'd like to see your best QBasic programs. They must be 50 or fewer lines and include a brief explanation of how each program works, and how other readers might adapt it to their needs. We're partial to short listings that solve a computing problem or overcome DOS's limitations, rather than application software.

Send your QBasic programs, each with a brief explanation of how it works, to:

QBasic Submissions
DOS Resource Guide
80 Elm St.
Peterborough, NH 03458

Or upload the files to our on-line addresses:

CompuServe 75300,2361
MCI Mail 469-7260
DRG BBS (603) 924-3181

The 2nd Annual Guide to Utilities

TABLE of CONTENTS

Antivirus Programs.....	48
Backup Programs	51
Data-Recovery Programs.....	53
Diagnostic Programs	53
Disk Utilities.....	56
Disk-Caching Programs	56
Disk Compressors	57
Disk Optimizers	57
DOS Command Replacements	58
DOS Shells.....	59
File Managers	62
Archivers and Compressors	62
Conversion Programs.....	63
File-Transfer Programs	65
Graphics Utilities.....	65
Search Programs	66
Memory Managers.....	67
Multipurpose Programs.....	68
Print Spoolers.....	70
Screen Utilities	71
Cursor-Control Programs.....	71
Screen Blankers	71
Screen Optimizers.....	71
Security Programs	72
Task Swappers and Multitasking Environments	75
Miscellaneous Utilities.....	76

By Tom Badgett & Corey Sandler

Who says DOS is dead? In the 15 months since we published our first annual guide to utilities, Microsoft introduced a beefed-up version of MS-DOS, IBM and Novell upgraded their own DOS alternatives, and WordPerfect 6.0 for DOS fought off Windows-based competitors to continue leading its category. Meanwhile, DOS utilities—those narrow yet necessary programs that make up for some of DOS's deficiencies—occasionally muscled Windows entries aside to break into software retailers' "top 20" lists.

True, revenue from sales of Windows software exceeded that from DOS programs, and most software makers said they're giving priority to Windows development. Still, *existing* DOS systems continued to be the machines of choice for millions of users. People simply haven't stopped using their tried-and-true DOS machines to do real work.

The continued health of the DOS software industry is broadly reflected in the raw numbers of utility programs and vendors listed in the following pages. Though there was a small net loss in "population" (after factoring in both "birth" and "death" rates), when you add the 69 products we overlooked last time, the list rises to 323 products. That's 50 more than appeared in last year's guide. Finally, when you consider that the past year brought major upgrades of best-sellers such as The Norton Utilities, PC Tools, and QEMM, there's no doubting the continued need for software that takes up where DOS leaves off.

ANTIVIRUS PROGRAMS

If your experience with viruses is limited to the common cold and an occasional bout with the flu, thank your lucky stars. Just don't think that you and your computer are immune.

Your system runs a bigger risk of infection if you habitually download programs from unsupervised bulletin board systems (BBSs), if you use pirated software or let other people use your system—but no computer is completely safe.

The first sign of the presence of a virus may be missing files or an unexplained loss of speed. Other possible effects include unusual screen messages; strange memory readings; changes in the directory, boot record, or partition table; unexpected changes in the sizes of files; or DOS operations, such as formatting, that occur by themselves. Sometimes programs that once ran flawlessly report unusual errors or don't run at all.

Computer viruses fall into several classes, defined by method of attack:

- **Program viruses**, the most common type, infect executable files (COM, EXE, SYS, BAT, and overlay files) by attaching themselves to the file and executing with it.

- **Boot-sector viruses** attack the first logical sector of a floppy or hard disk, a critical area that stores information about disk partitions and the location of files. Usually spread via floppy disks, these viruses move onto a hard disk when you boot your system from an infected floppy. Boot-sector viruses can alter or destroy boot tracks, directory information, and File Allocation Tables.

- **Memory-resident viruses** (also called **TSR viruses**) hide in RAM, infecting files by intercepting DOS interrupts and redirecting them.

- **Stealth viruses**, variants of TSR viruses sometimes called *new-generation viruses*, are more virulent. They bypass DOS interrupts, thereby avoiding detection by most antivirus programs.

- **Polymorphic viruses**, also called *mutation engine viruses*, are a variant of stealth viruses. They change their signatures as they replicate, making detection difficult.

Antivirus software uses its knowledge of viruses to detect changes made to programs or memory and to take steps toward counteracting those changes. To do this, it uses one or more of the three common detection modules: a virus scanner, a memory-resident monitor, or a checksum analyzer.

A *scanner* compares its internal database of virus signature codes against programs it finds in memory or on disk, sounding an alert if it finds code it recognizes. Scan programs are effective against known viruses but defenseless against new viruses or variations of known infections. Scanners are becoming

more sophisticated, however; sometimes they can modify their internal data based on what they find in your system. To remain effective, they generally must be updated regularly.

One type of *memory-resident monitor* sits in RAM and searches for the same virus signatures constantly. Another type operates as a memory-resident utility, intercepting requests to access a disk and checking for suspicious behavior, including attempts to alter EXE or COM files. Unfortunately, some legitimate programs—among them Lotus 1-2-3—routinely make changes to such files. Another problem with disk-access monitors is that a savvy programmer can get past them by manipulating your hardware directly.

Checksum analyzers detect changes to an executable file by applying an algorithm during installation and then checking for alterations. Like disk monitors, they alert you to virus activity when a program changes an executable file for legitimate reasons.

How can you get the best virus protection? If you have DOS 6.x, you already have an antivirus system that offers a good first-line defense. But you also have a number of other options, some of them more potent.

The first rule of thumb in choosing an antivirus program is selecting one that features more than one protection method. DOS 6.x's MSAV (or the Windows version, MWSAV), for example, includes both scanning and memory-resident components. The scanner tells you whether your computer already has a virus; its memory-resident portion helps ward off new infections.

After you select your software, the best defense against infection is a strong offense. Assume that any new software you install is contaminated. When you log onto a remote computer, bet that that system has an infection capable of bringing your system to its knees.

Many antivirus programs offer to attempt to fix infected programs. But if an executable program is contaminated, the only really safe fix is erasing the application and reinstalling it with the original, write-protected disk.

And, just for good measure, practice good backup procedures, with one of the utilities in the following sections.

AntiVirusPLUS 4.20.23, \$59.95

This memory-resident virus-prevention, -detection, and -cure utility detects known and unknown viruses within your system or on floppy disks. It prevents known and unknown viruses from penetrating your system and can find and remove known viruses without damaging the

underlying program. Generates a warning whenever suspicious changes occur in DOS or the BIOS, boot sector, partition table, file allocation table, or other system information.

Techmar Computer Products Inc., 98-11 Queens Blvd., #2C, Rego Park, NY 11374; 800-922-0015 or 718-997-6666.

Central Point Anti-Virus 2.1, \$129.95

Searches for and removes known viruses in memory or on disk. Attempts to detect and clean unknown viruses by verifying checksums and checking for file irregularities. Lets you delete infected files. Scans for known and unknown boot-sector and partition-table viruses during bootup and when disks are used. Operates from the DOS command line or menu-based screens. (Windows version available.)

Central Point Software, 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, OR 97006; 800-445-4208 (customer service), 800-333-6561, or 503-690-8088.

Clean-up 1.12, \$35 single-user home version

A virus-removal utility you may use after identifying viruses with Virscan (see the description below). The program disinfects all common viruses by removing the viral code from the infected program and rewriting the cleaned program. If the a virus can't be removed successfully, you may tell Clean-up to overwrite and delete the infected file. Displays messages in English and French. (Price includes two years of updates. Site licenses available.)

McAfee Associates, 2710 Walsh Ave., Suite 200, Santa Clara, CA 95051; 408-988-3832.

Data Physician Plus 4.0c, \$49

One of the older antivirus programs, this utility includes a module called VirHUNT, which can scan your disk in search of more than 1,000 known viruses and 1,800 variants. VirHUNT stores "signatures" of the boot record and files on the system, using them to detect unknown viruses. Also included is a programming language, CIL, with which you can define the characteristics of new viruses for which to search. RESSCAN, a memory-resident virus scanner, checks programs as they are run, opened, or copied.

Other modules include SAFEBOOT, which protects the operating system by installing a custom DOS boot record, and ANTIGEN, which installs an antivirus module on an executable program. (Works on all local area networks.)

Digital Dispatch Inc., 9725 Pleasant Ave. S., Suite 2L, Bloomington, MN 55420; 800-221-8091 or 612-884-9914.

Detect Plus 2.11, \$99

Detect Plus, a memory-resident virus-detection and -prevention tool, checks for virus infection during boot-up, prevents writes to boot records, and automatically looks for and scans floppy disks before executing a DOS

command. Scans automatically for infections of known viruses and searches for unknown strains. Lets you design custom cryptographic signatures for selected files and conduct system, boot-record, and file checks at bootup. Locates changed files and flags them as sites of possible infection.

Information Security Services Inc., 12211 Distribution Way, Beltsville, MD 20705; 800-334-8338 or 301-470-2500.

The Doctor Antivirus System 3.9.03, \$99

The memory-resident VBTsr module of this multifunction antivirus package (formerly Virus Buster) checks for unauthorized access to critical areas on disks and examines program files for signs of infection as they are loaded. Checksum uses an encrypted checksum method to monitor programs and system areas. Doctor uses a signature-recognition method to scan memory and the entire hard disk for known viruses. Includes DiskLok and KeyLok, password-protected software locks for your hard disk and keyboard. Compatible with Novell, Banyan Vines, 3Com, PC-NFS, IBM Token Ring, MS LanManager, and other networks. (Site licenses and discounted educational licensing available.)

Thompson Network Software (a division of Leprechaun Software International), P.O. Box 669306, Marietta, GA 30066; 800-521-8849 (orders) or 404-971-8900.

Dr. Solomon's Anti-Virus Toolkit 6.5, \$149.95

An antivirus toolkit that detects, identifies, and destroys viruses on hard disks and floppy disks. The FindVirus program searches for more than 1,400 viruses and variants. To protect against known and unknown viruses, ChkVirus inoculates your system by creating a checksum calculation on executable programs. VirusGuard is a memory-resident version of FindVirus. Also included is Browse, which permits exploration of any file in ASCII or hexadecimal format; Peek, which examines boot sectors and partition code; and Shred, a security program that overwrites files so they can't be undeleted. Provided on notches (read-only) disks to prevent the program itself from becoming infected. (Updated monthly. Windows version, \$195; OS/2 version, \$195.)

OnTrack Computer Systems Inc., 6321 Bury Dr., Suites 15-19, Eden Prairie, MN 55346; 800-752-1333 or 612-937-1107.

F-PROT Professional 2.11a, \$49.95

A menu-driven virus scanner and disinfectant, F-PROT Professional scans local and network drives for multiple viruses. In addition to locating Trojan horses (software that appears to be legitimate but is designed to damage your computer), it finds known and unknown viruses in applications and within a disk's boot sector. Features an easy-to-use menu interface. Optional yearly maintenance fee (\$79.95) guarantees BBS access. (Site licenses available; free network loadable module [NLM] included with site license.)

Command Software Systems, 1061 E. Indiantown Road, Suite 500, Juniper, FL 33477; 800-423-9147 or 407-575-3200.

Freeze! 4.2, \$89.95

This access-control and virus-shield utility prevents unauthorized access to your PC while guarding against viral infections. Permits as many as five access passwords per machine and includes screen blanking, keyboard locking, and boot protection.

Command Software Systems (see listing immediately above).

The Norton AntiVirus 3.0, \$129

A DOS and Windows virus-detection and -removal utility that finds and removes viruses before they go to work, by scanning programs before they are launched. Detects more than 2,000 known viruses and can find unknown strains by monitoring disk activity and other checkpoints. Latest version incorporates Virus Sensor, a rule-based integrity checker that watches for virus-like activity and compares file characteristics with a snapshot stored in RAM before program execution. Repairs damaged file areas automatically before the virus finishes propagating. Includes an optional virus service from Symantec to keep virus protection up to date; also provides password protection for applications and audit-trail reporting. New windowed interface offers on-line hypertext help. (Upgrades \$29 plus \$8 shipping. Site licenses and network packs with network-specific features available.)

Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

Panda Pro 1.3, \$500

The Panda Pro antivirus package includes the Findvirus scanner, which is capable of identifying more than 1,650 known viruses, and the Beartrap monitor, which guards against unauthorized access to a hard disk or memory and prevents other suspicious activity. A third module, Dr. Panda Utilities, contains a set of generic detection and protection products, as well as repair functions for fixing infected boot sectors. Also produces a complete audit trail. (Price includes license for up to 50 users.)

Panda Systems, 801 Wilson Road, Wilmington, DE 19803; 800-727-2632 or 302-764-4722.

PC-cillin 4.0, \$99

A hardware and software immunizer, PC-cillin works to combat known and newly developed viruses. The package includes programs to scan your current system, guard against and detect new infections, and quarantine "foreign" resource files. Includes a "dongle" plug that attaches to the parallel port of your computer and stores a copy of your hard disk's boot sector and partition table for use in emergencies. (When you attach your printer to the dongle, it functions normally.) The latest version of the program includes Trend's new MutieClean technology to fight mutation-engine viruses. (For details, see PC Rx entry above.)

Trend Micro Devices Inc., 2421 West 205th St., Suite D-100, Torrance, CA 90501; 310-782-8190.

PC Rx 4.0, \$69

This intelligent virus filter and monitor for PCs and LANs searches for virus symptoms as a means of detect-

ing new types of infections. Its virus-scanning and -removal methods detect all known viruses, while rule-based traps guard against unknown viruses. In addition, the latest version of the program features a new technology, MutieClean, which detects and removes mutation-engine viruses at any generation. Compatible with NetWare, LAN Manager, Lantastic, Banyan, and PC LANs. Package includes DOS, Windows, and Macintosh versions of the program. (Upgrades and site licenses available.)

Trend Micro Devices Inc. (see listing immediately above).

Security Guardian 3.72, \$250

An access-control and virus-protection program, Security Guardian lets you use as many as five passwords per PC to limit access, prevent unauthorized boots, and lock directories. Also lets you customize security levels for various operations by setting file attributes, disabling the Ctrl-C key combination, and restricting access to serial and parallel ports and SYS files. Produces a variety of reports, including user and application logs. Lets you customize the program's menu system with security switches, 100 levels of passwords, unlimited levels of submenus, and selectable colors and layout.

Command Software Systems (see listing for F-PROT Professional, above).

StopLight Security, Menu, and Antivirus System, \$195

A memory-resident antivirus scanner based on the VirusNet/Pro system (see entry below for details), StopLight turns on your computer and then stays in the background, ready to step in instantly if a virus attempts to damage the system.

Included in the package is the Drive-In AntiVirus Menu System, which makes the program easy to use and lets you automate virus detection and removal. Drive-In also includes a menu-based program launcher, a start-up graphics display that lets you create a custom opening screen containing your company's logo, and a screen blanker. (Windows compatible. Network version, StopLight/LAN, also available. StopLight ELS, an access-control system, is covered in the "Security Programs" section.)

Safetynet Inc., 55 Bleeker St., Millburn, NJ 07041; 800-851-0188/201-467-1024 or 908-851-0188 (international division).

Vaccine 5.0, \$129

Vaccine, an antivirus scanner and monitor, makes a cyclic redundancy check (CRC) calculation for the boot sector and all programs residing on user disks. The memory-resident component monitors a computer's activities and notifies you if anything suspicious occurs. Protects against stealth viruses by maintaining a copy of the original boot sector.

The Davidson Group, 20 Exchange Place, 27th Floor, New York, NY 10005; 212-422-4100.

VirAway 20.23, \$29.95

This virus-detection and -removal software does its job without making itself memory resident. It removes a

virus infection from memory as soon as it is detected, then scans the entire disk for additional infections, removing those it finds. Creates a history file of all viruses ever detected and removed from the system.

Techmar Computer Products Inc. (see listing for AntiVirusPLUS, above).

Virex for the PC 2.91, \$49.95

An active virus fighter that includes a memory-resident monitor, a file-by-file scanner capable of detecting more than 1,700 infections, as well as a checksum program that creates a table of information about every executable file in the system and alerts the user to any changes. The CRITICAL and INOC modules recover infected files. Virex creates an emergency disk that lets you boot a computer if crucial areas of its hard disk are damaged by a virus. Menu-driven interface.

Datawatch Corp. (formerly Microcom Software Inc.), 79 T.W. Alexander Dr., P.O. Box 13984, Research Triangle Park, NC 27709; 919-549-0711.

VirusSafe 5.4, \$99

This virus-removal program has a memory-resident module that monitors system activity for suspicious behavior, including unauthorized access to boot sectors, program files, and memory. When an infection is detected, VirusCheck isolates the virus in memory. If the virus is known to the program, use UnVirus to remove it. If the virus is unknown, VirusCheck can update its database of virus signatures so that you can scan backup disks and other computers immediately. The latest version incorporates a more flexible scanner that works with external signature files and with compressed and archived files. Additional command-line switches handle batch processing. (Ten-user network version, \$595.)

EliaShim Microcomputers, 4005 Wedgemere Dr., Tampa, FL 33610; 813-744-5177.

Viruscan 99 1.12, \$25 single-user home version

The Viruscan virus-detection utility scans an entire drive, a particular subdirectory, or a single file for known or suspected viruses. It identifies all known viruses, including stealth types, showing which parts of the system—files, boot sectors, partition tables, or memory—are infected. (Price includes two years of updates. Site licenses available.)

McAfee Associates (see listing for Clean-up, above).

Virus Check & Cure 1.0, \$39.99

This virus-detection and -removal utility searches out virus infections, disk errors, and data corruption. When a virus is detected, the program inoculates infected files to keep the infection from spreading to other files in the system. Prevents viruses from becoming memory resident while fully protecting your hard disk's boot partition and FAT. (Windows compatible.)

The Wizardworks Group, 3850 Annapolis Lane N., Plymouth, MN 55447; 612-559-5140.

VirusCide Plus 3.2, \$69

This virus-detection and -removal system includes VirusCide, which scans and cleans executable files on

drives and in memory. This module scans PKLITE and LZEXE compressed files, as well. Displays information on detected viruses and permits automatic or manual removal. Also includes ViruCide Shield, which monitors file and disk activity for signs of a virus and warns when one is detected. Uses artificial intelligence techniques to determine the presence of active viruses, providing protection against unknown as well as known sources. Can be loaded into upper memory.

Parsons Technology, P.O. Box 100, Hiawatha, IA 52233; 800-223-6925 or 319-395-9626.

VirusCure Plus 2.41, \$29.95

A scanning and antivirus utility that identifies and removes at least 920 known viruses, later repairing and restoring damaged files. Installs a memory-resident component, Protect, to prevent known and many unknown viruses from entering your system. Can even find and remove viruses in compressed files. May be installed on file servers. (Network version available, \$49.95.)

International Microcomputer Software Inc. (IMSI), 1938 Fourth St., San Rafael, CA 94901; 800-833-4674 or 415-454-7101.

Virus Guard, \$29.95

This virus-detection utility searches out infections by checking the size of a file each time it is opened. The program presents the user with a warning when it detects a change in the size of a file.

Interplay Productions Inc., 17922 Fitch Ave., Irvine, CA 92714; 800-969-4263 or 714-553-6655.

VirusNet/Pro, \$49

VirusNet/Pro includes secure, heuristic, and checksum scanners, with rule-based analysis, digital signature scanning, and a real-time monitor operating against known and unknown viruses. The program also offers password protection of your settings and automatic scan intervals. An on-screen encyclopedia of virus information is included, as well as Rescue, a program that stores vital parts of your PC's hard disk and CMOS in case your system fails to boot properly. (Network compatible. Windows version included.)

SafetyNet Inc. (see listing for StopLight, above).

Virus-Pro 3.1, \$99.95

A single-minded antivirus guardian, Virus-Pro works from a floppy disk. Place the Virus-Pro disk in a floppy drive, turn on the system, and the software checks to see whether any program, path, boot sector, or partition table has changed since the last verification. If Virus-Pro notices a change, it produces a detailed report. This scheme is designed to locate new and modified viruses that might not be found by other types of antivirus programs.

International Security Technology Inc., 99 Park Ave., 11th Floor, New York, NY 10016; 212-557-0900.

Virus-Safe 1.24, \$62

A memory-resident or device-driver antivirus utility that continually checks files for changes. It warns users when a virus is detected; transparent to users.

Enigma Logic Inc., 2151 Salvio St., Suite 301, Concord, CA 94520; 800-333-4416 or 510-827-5707.

Vi-Spy Professional Edition 12.0, \$149.95

Vi-Spy includes a scanner module that identifies viruses in files or sectors. Its Cleanup module removes viruses from corrupted data, and two memory-resident programs automatically monitor all files that are executed, unzipped, downloaded, or moved. Infected files are disabled immediately. The program may be run automatically on user-specified days.

RG Software Systems Inc., 6900 E. Camelback Road, #630, Scottsdale, AZ 85251; 602-423-8000.

Vshield 99 1.12, \$25 single-user home version

A memory-resident virus-prevention utility, Vshield monitors all requests to load programs and reboot the system. It prevents infected programs from executing, which prohibits the virus from propagating itself in other areas of the system. Establishes optional boot-sector checking during disk access and file checking during copying. Its access control lets you run only validated files. (Price includes two years of updates. Site licenses available.)

McAfee Associates (see listing for Clean-up, above).

BACKUP PROGRAMS

Imagine for a minute that you just bought the car of your dreams. You finish the paperwork, and the salesperson hands you one key. Would you protest and ask for a spare? Of course you would, because you probably know from experience that losing your only copy of the key would be inconvenient—perhaps disastrous.

You need the same kind of insurance with your data. Sadly, though, most of us are cavalier about data backup. For one thing, we tend to “forget,” perhaps because we consider the process complicated and time-consuming.

Things are changing, though. Although early backup software was difficult to master, today's packages are versatile and simple to use. If you choose carefully from among the backup utilities listed here, you'll find a program that makes the task if not enjoyable, at least efficient and trouble-free.

If you use DOS 6.x, you have a backup-and-restore utility at your fingertips: MSBACKUP (MWBKUP is the Windows version). Menu driven and easy to use, MSBACKUP remembers your last backup routine. If you regularly work only in a few directories, it can back up these files repeatedly without additional setup. Naturally, it also lets you copy files across disk boundaries (to more than one disk if the file size exceeds the capacity of one floppy).

If you don't have DOS 6.x, if you prefer a different interface, or if you need additional features, research the market and get a utility you'll use. Look for the features you need, such as support for high-density tape drives or the ability to compress data.

If you run a network, for instance, your backup program should operate in that environment and permit automatic backups for times when no one uses the server. If you need to restrict access to backup data sets, go for a product such as PCX's BackupWiz, which lets you password-protect backups. Some products also offer data encryption using the industry-standard protocol, DES, or another protocol.

You may also want the ability to restore data to any drive letter and directory you specify. Some products—for security reasons or because their features are limited—force you to restore information to the location from which it was backed up. If you work with a variety of systems and configurations, you may need backup software that lets you specify the destination of the restored data. You should realize, however, that doing this could lead you to copy information to the wrong directory and overwrite important files.

Finally, consider the difficulties of keeping track of piles of disks and tapes. Some products can create electronic or stick-on labels for tapes and disks. These aids help you remember which backup version you are working with and where your most current data resides. Fortunately, however, if the backup program you select for other reasons doesn't offer this feature, you can buy a separate disk-labeling utility, such as Personally Developed Software's DOS File Tracker or Power Up's Name That Disk (see the section "Archivers and Compressors" on page 62).

Autosave 1.0, \$39

This memory-resident utility automatically saves current files from spreadsheets and other applications at pre-defined intervals. Prevents data loss owing to power failure or other mishaps.

Biologic Co., 7950 Blue Gray Circle, Manassas, VA 22110; 800-736-8088 or 703-368-2949.

Back-It 4 1.4, \$169

A hard disk utility that copies files onto floppy disks and tapes, Back-It uses a memory-resident scheduler to conduct compressed backups automatically at speeds as high as 10MB per minute. Offers as much as 75 percent data compression. Includes Gazelle Systems' Q-Menu, a password-protected menuing system. (Windows compatible.)

Gazelle Systems Inc., 305 North 500 W., Provo, UT 84601; 800-786-3278 or 801-377-1288.

BackupWiz 3.39, \$149

This tape- and floppy-backup software for SCSI hardware lets you back up and restore entire volumes or selected files and directories. Lets you select files by characteristics such as subdirectory name or whether the file has changed since the last backup. Permits you to restore files to a different directory or choose files by date and other criteria. Lotus-style menuing system makes the program easy to use; optional password protection provides data security. Compatible with Novell NetWare and NetBIOS.

PCX Corp., 3525 Del Mar Heights Road, Suite 313, San Diego, CA 92130; 800-800-4729 (orders) or 619-259-9797.

Central Point Backup 8.0, \$129.95

File viewers for 30 popular programs let you see files before selecting them for backup. Supports a wide range of backup devices, including all DOS devices and those that follow the QIC-40/80 standard. Also translates setup files created in Symantec's Fastback Plus and The Norton Backup. (Windows version available.)

Central Point Software, 15220 N.W. Greenbrier Parkway, Beaverton, OR 97006; 800-445-4208 or 503-690-8088.

Conner Backup Exec for DOS and Windows 3.21, \$149

Backup Exec offers two sets of SCSI-disk backup utilities: one for DOS and another for Windows. (The package includes both.) The programs' graphical user interface makes it easy to create log files recording the progress of backup operations and to select a backup method (incremental, differential, or full). Lets you conduct backup sessions in the background or schedule unattended backups at specific times. (Compatible with Novell NetWare.)

Conner Peripherals, 36 Skyline Dr., Lake Mary, FL 32746; 800-5CONNER or 407-263-3500.

Diskpack 3.0, \$49

A backup and file-compression utility, Diskpack copies up to 10MB of data to as few as two disks in about four minutes. The program's integral-compression method reduces storage requirements by as much as 80 percent. Compatible with all drives and disk sizes.

Biologic Co. (see listing for Autosave, above).

DOS-TAR, \$285 plus \$15 shipping

Designed to work in multiplatform DOS/Unix environments, DOS-TAR can back up your files from a DOS-based PC to a tape or floppy disk in either format. The program's automatic data conversion lets a DOS-based PC read Unix backups; a Unix system can read DOS-TAR backups created on a DOS-based PC.

The program also features 50 percent data compression, the ability to salvage data from a hard or floppy disk with bad sectors, the ability to recover if the program encounters disk errors during restoration, and automatic unattended backups according to a predetermined schedule. (SCSI and QIC-02 tape drivers available separately, \$99 each.)

Lone Star Software/Cactus International, 13987 W. Annapolis Court, Mount Airy, MD 21771, 800-525-8649.

Fastback Plus 6.0, \$149

This full-featured automatic-backup and -restoration utility lets you use a simple menu or issue commands to back up hard disks to QIC tape or floppy disks. Compresses backup data by as much as 80 percent and automatically formats media during a backup. Can alternate between two drives for faster operation, as well as schedule automatic backups. Can restore files to the same device and directory or to new ones. Restore Estimate tells you how much space is required and whether enough is available to conduct the requested restoration. Creates a dBase-compatible backup history database and erases files after a backup, which is useful for building an archive. Fastback Plus also permits laptop-to-desktop and desktop-to-desktop backups via parallel cable. The newest version of the program incorporates virus scanning as either a separate operation or during start-up, backup, and restoration. Also features a new on-screen hypertext help system. (Windows version, \$189; network version, \$225 per server.)

Fifth Generation Systems/Symantec Corp., 2500 Broadway, Santa Monica, CA 90404, 800-441-7234 or 408-253-9600.

MyBackup 1.2.0, \$24.95

A backup-and-restore utility that lets you back up a complete disk or subdirectory or select only changed files from the on-screen display. Stores files in standard DOS format so that you can view a disk's contents and restore specified files easily. A point-and-shoot interface lets you restore a group of marked files or the entire backup set.

MySoftware Co., 1259 El Camino Real, Suite 167, Menlo Park, CA 94025; 800-325-3508 or 415-325-4222.

The Norton Backup for DOS 2.2, \$149

Offers manual or automated backups and lets you conduct a backup at a preset time. Comes with a graphical interface and calendar for scheduling backups for hard disks, network drives, tapes, and any DOS device. Use data compression to reduce backup storage requirements and view file contents before backup, without loading the source application. Includes password protection to prohibit unauthorized personnel from restoring your backup images and to protect your backup disks from being overwritten. (Windows version available.)

Symantec Corp. (see listing for Fastback Plus, above).

SAMS:Save 5.0, \$100

Known formerly as DMS/IB Intelligent Backup, SAMS:Save lets you do full, incremental, and consolidated backups from a hard disk to any media that can be addressed by DOS, including floppy disks, hard disks, SCSI tape, disk cartridges, optical disks, and mainframe virtual disks. Lets you create a complete record of all data with a full backup, then complete subsequent backups quickly by doing an incremental operation.

Consolidated backup removes redundant files, reorganizing the rest automatically. Releases space occupied by multiple versions of a file or space taken up by backups whose primary files were deleted from the system. Includes other "intelligent" backup features to maintain data integrity and maximum efficiency.

Sterling Software, 11050 White Rock Road, Rancho Cordova, CA 95670; 916-635-5535.

Sytos Plus Backup for DOS 1.4x, \$149

Backs up hard disk data—to tapes, floppy disks, or magneto-optical disks—at rates as high as 14MB per minute. Predefining file selections and other criteria lets you conduct unattended backups. A "scheduler" module lets you run an automatic backup during off-peak hours on networks or individual machines. Lets you perform error-correction code (ECC) backups for additional data security. You may select files and set other criteria via the program's graphical user interface. The newest version provides a new menu-based quick-start screen, as well.

Sytron Corp., 134 Flanders Road, Westboro, MA 01581; 800-877-0016 (orders) or 508-898-0100.

Tapedisk, \$249.95

A tape-backup utility for DAT or QIC-1000 tape drives, Tapedisk also lets you create, view, open, edit, and save files to tape as if you were using a hard disk. Installs as a device driver, assigning a disk-drive letter to your SCSI tape drive, so that you may both write to and read from the drive. Lets you use a single command to make an exact copy of all local hard disks on a cartridge tape. Handles unattended backup for a system's physical and logical drives. Average file-access time is 15 seconds; backup speeds approach 18MB per second.

Tapedisk Corp., 2908 Fond du Lac Road, Oshkosh, WI 54901; 715-235-3388.

DATA-RECOVERY PROGRAMS

Evelyn Johnston, a world-renowned flying instructor and pilot of anything that flies, tells her students, "It isn't the mistakes you make that are important, it is how you recover from them that counts." That observation is as true for computers as it is for flying, except that a flying mistake is more likely to result in loss of life. Of course, if you lose someone else's data, and they get angry enough . . .

If you have a good data-recovery utility, however, you won't have to worry about such dire consequences. Whether you erase the wrong file or subdirectory accidentally, reformat your hard disk by mistake, or lose part of your file during a save owing to a bad spot on the disk, you can usually recover most of your data if you keep your head and reach for the right tool.

For tasks such as these, many PC users turn to DOS 6.x's UNFORMAT and

UNDELETE commands. Others rely on the services provided in multifunction programs, such as Central Point Software's PC Tools or Symantec's Norton Utilities (see "Multipurpose Programs" on page 68). Still others use dedicated recovery products such as those listed here to resurrect lost data.

All data-recovery programs owe their success in undeleting files and unformatting hard disks to DOS. When you delete a file, DOS saves time by changing one character in the directory entry rather than deleting the contents of each file. When you reformat a hard disk, only the File Allocation Table (FAT) and root directory are deleted. The data in a deleted file or on a reformatted hard disk remains intact until it is overwritten.

When write errors occur, DOS doesn't update the directory, because it couldn't write the whole file. But a portion of the data—perhaps most of it—was written to disk. With a program such as The Norton Utilities, you can scan the disk and recover the data that was saved.

Some data-recovery software takes a more active approach. Software Matters' Savior, for example, intercepts any calls for file deletions, removes the specified file from the directory in which it was located, and copies it to a hidden directory, where it stays until you finally purge the list. DOS 6.x's Undelete Sentry works similarly. The advantage to this approach is obvious: Even after a file is deleted, it exists in its original form at another location on your disk.

Immunity 2.0, \$249

A "mirror" utility that maintains identical information on two PC disks simultaneously, Immunity protects you from losing data when a hard disk fails. Works on any pair of local drives. Can retrieve data from the fastest disk in a two-disk pair, reducing access time and hard-disk wear. Using removable media for one of the disks lets you accomplish "fault tolerance" and backup at the same time. Device driver requires 17K of RAM.

Unitrol Data Protection Systems Inc., 2108 1177 W. Hastings, Vancouver, British Columbia V6E2K3; 800-665-2212 or 604-681-3611.

PC RESC-U, \$39

Creates a bootable emergency disk you may use in the event your hard disk crashes. An emergency disk records critical information such as CMOS data, master boot record, partition table, and start-up files. If disaster strikes, you insert the PC RESC-U disk into your bootup floppy drive and reboot. PC RESC-U analyzes the situation and offers you two choices: automatic recovery of system data or examination of the differences between hard disk data and PC RESC-U disk data, with the option to skip restoration. Conducts a virus check to ensure that the system isn't infected.

EliaShim Microcomputers, 4005 Wedgemere Dr., Tampa, FL 33610; 813-744-5177.

Reflect 4.0, \$99

A disk utility that creates a mirror image of the files on one or more logical drives and stores that information on another logical drive. If your primary hard disk fails, Reflect switches operation to the mirrored drive automatically. (Network version for five users, \$249. Site licenses available for up to 250 users, \$1995.)

Clone Star Software, 24102 Palo Duro, Hockley, TX 77447; 800-484-9369 or 713-256-2886.

Rescue Data Recovery Software 4.5, \$399

Recovers data from physically damaged floppies or hard disks. Reportedly recovers valuable data as long as the disk will spin. Includes support for disks compressed with DOS 6.x's DoubleSpace, Stac Electronics' Stacker, and AddStar's Superstor.

AllMicro, 18820 U.S. Highway 19N, Suite 215, Clearwater, FL 34624; 800-653-4933 or 813-539-7283.

Savior 2.0, \$89.95

Savior retrieves a current file or a previous version, even if it is scattered over several portions of a disk. Lets you find a file as it existed several versions ago. Works by saving deleted files to a hidden subdirectory until you ask to retrieve them. Can archive as many as 256 deleted files; deletes the oldest file when you exceed the limit. In addition, keeps a maximum of nine versions of a working file as you modify and save it from within an application. Retrieves previous versions from within the application.

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

DIAGNOSTIC PROGRAMS

Diagnostic utilities make good companions for data-recovery tools. What do they do? Good question. As the following collection of products illustrates, the capabilities of these programs vary so greatly that the genre is hard to define.

As their name suggests, the primary goal of diagnostic packages is helping you find and correct problems. They also may assist in keeping your system running at peak performance or show which of your system's facilities are in use—a boon when you're installing new applications or hardware. Of course, diagnostic packages educate you about your system, as well.

WaterGate's PC-Doctor, for example, offers more than 200 tests and system-information functions. Touchstone's CheckIt PRO provides 50 charts detailing your PC's hardware and software subsystems. Another classic diagnostic tool, Landmark's System Speed Test, shows how your system's performance stacks up against that of other machines.

DiagSoft's QAPLus, a system-wide testing and reporting package, gives you a look "under the hood" at just about everything in your system. A program such as this one is ideal for educating yourself about a new computer, especially if you team it with a benchmarking utility such as Speed Test. This pair can also help when you need to put your system back together after moving it, and when you change its hardware configuration significantly.

One diagnostic utility probably can't handle all your system-inspection and -repair needs, but the right combination will take you far, letting you locate even minor, intermittent problems with memory or disk drives, determine whether hardware or software is causing a problem, compare your system's performance against others in its class, and figure out what interrupts are in use or where device drivers are loaded.

AlignIt 4.2, \$149

Diagnoses, aligns, and cleans floppy drives without an oscilloscope. Its comprehensive set of tests includes checks for head alignment, head-step linearity, track-zero alignment, drive speed, head-read span, head-actuator hysteresis, and electrical noise interference. Basic package includes a dry head-cleaning disk for a 3.5- or 5.25-inch drive; dual package (\$249) handles both types of drives. A "gold standard" feature lets you adjust the parameters of all drives so that alignment problems don't prevent you from exchanging disks among machines. You'll need a toolkit and a technical manual for your drives if you plan to make any adjustments to them.

Landmark Research International Corp., 703 Grand Central St., Clearwater, FL 34616; 800-683-6696 or 813-443-1331.

AMI Diag 4.06a, \$89.95 (\$49.95 promotional price direct from company)

This diagnostic package tests a system's CPU, RAM, ROM, hard drives and floppy drives, keyboards, video adapter and monitor, and ports. Its System Information module provides reports on hardware configuration; the Report module produces easy-to-read logs of tests and results.

American Megatrends Inc., 6145-F Northbelt Parkway, Norcross, GA 30071; 404-263-8181; or Vertisoft Systems Inc., Transamerica Pyramid, Fourth Floor, 600 Montgomery St., San Francisco, CA 94111, 800-466-5875/803-295-5875 (customer service) or 800-535-5859 (orders).

CheckIt PRO: SysInfo 1.0, \$99.95

Produces more than 50 detailed charts providing comprehensive reports on a PC's hardware and software subsystems. Lets you correct some problems as they are identified. Reports actual interrupt (IRQ) use instead of listing standard assignments. Tracks four hard-drive

parameters and recommends the best CMOS drive-type number. Compares a unit's CPU, video, and hard-drive benchmarks against results for 25 popular PC models.

Touchstone Software Corp., 2130 Main St., Suite 250, Huntington Beach, CA 92648; 800-531-0450 or 714-969-7746.

Computer Consultant, \$19.95

Utility for scanning PC hardware, reporting on installed components, and conducting speed tests. Tests hard disk and video-adaptor performance. Because it boots from its own operating system, you don't need DOS or any other operating system to run the program. Comes with a leatherette, wallet-style case, equipment list, notepad, and pencil.

Micro 2000 Inc., 1100 E. Broadway, Suite 301, Glendale, CA 91205; 818-547-0125.

Conflict Finder for DOS, \$29.95 (\$15 promotional price direct from company through August 15, 1994)

Locates and identifies sources of conflict among your system's boards, including sound cards, CD-ROM drivers, video cards, network cards, and any other type of peripheral.

Dariana Software, 5241 Lincoln Ave., Cypress, CA 90630; 800-892-9950 or 714-236-1380.

Disk Technician Gold 1.22, \$149.95 (\$59.95 promotional price direct from company through June 30, 1994)

A memory-resident device driver, this program finds and repairs hard disk problems in the background while your other programs are running. Recovers and relocates corrupted data, spots dangerous disk deterioration, and guards against viruses. A separate, menu-based program offers defragmenting, interleaved testing and resetting, nondestructive low-level formatting, and additional drive tests. Newest version upgraded for DOS 6.x. (Windows compatible. Also compatible with DoubleSpace, Stacker, SuperStor, and SuperStor Pro disk compression.)

Disk Technician Corp., 1940 Garnet Ave., San Diego, CA 92109; 800-847-5000 or 619-274-5000.

DisplayMate Video Display Utilities 1.1, \$149 DisplayMate Professional 1.0, \$249

A testing-and-configuration series identifying the optimum configuration for video adapters and monitors. DisplayMate Video Display Utilities evaluates, tests, and adjusts video components for peak performance and the best possible image quality. It identifies problems that can lead to eyestrain, loss of productivity, or costly repairs. Also tests for geometric distortion, resolution, color and color registration, system compatibility, and speed.

DisplayMate Professional, an enhanced video-system testing-and-configuration utility, conducts all tests supported by DisplayMate Video Display Utilities and sends comprehensive reports and test logs to a

printer or disk file. In addition, it designs test scripts or procedures, which you store as command files and use to automate DisplayMate. Supports all hardware refresh rates in interlaced and noninterlaced modes.

Sonera Technologies, P.O. Box 565, Rumson, NJ 07760; 800-932-6323 or 908-747-6886.

DosUtils 3.1, \$99.95

These hard-drive maintenance utilities check your hard drive for potential mechanical problems or disk-surface defects. If DosUtils finds a bad area, it moves your data to a safe location automatically. The package also checks for and repairs lost blocks or cross-linked files, allows access to the backup file allocation table, and undeletes files. A built-in editor lets you modify information—in either hexadecimal or ASCII format—of any disk sector.

OnTrack Computer Systems Inc., 6321 Bury Dr., Suites 15-19, Eden Prairie, MN 55346; 800-752-1333 or 612-937-1107.

ExperTrace, \$99

ExperTrace analyzes your system's disk drives, I/O ports, drive controllers, memory, CMOS, and video display. It can also perform low-level disk formatting and floppy disk read/write/seek tests. (Compatible with DOS, OS/2, and Unix. Also available as a plug-in board: TraceCard, \$189.)

Intelogic Trace Inc., P.O. Box 400044, San Antonio, TX 78229; 800-531-7186 or 210-593-5700.

InfoSpotter 3.5, \$79.95

InfoSpotter analyzes operating systems, memory, and peripheral devices. Tests interrupt levels, lists I/O port addresses, and lets you view and edit disk sectors. Displays memory maps that show how DOS, memory-resident programs, and other applications are using available memory. Lets you create your own menus, change screen colors, and edit your system's CMOS code and batch files. Also generates customized reports. Newest version upgraded for DOS 6.x compatibility.

RenaSonce Group Inc., 5173 Waring Road, #115, San Diego, CA 92120; 619-287-3348.

Micro-Scope 4.29, \$499

A low-level formatting program for IDE drives, this utility includes its own operating system, which means that all drive-test commands and calls are sent directly to the drive, avoiding possible false interpretation by DOS and the BIOS. You may use the package's floppy- and hard disk editors to access and rewrite the data on any portion of a system's disks.

Micro 2000 Inc. (see listing for Computer Consultant, above).

NetCensus 2.00, \$149 (five-user pack)

This configuration manager for networked and stand-alone PCs inventories and tracks the PC hardware and software on your network or within your company. Scans a system automatically to identify brand-name software and hardware components, including communication cards, coprocessors, and add-on memory. Offers customizable user screens and support for

user-developed software in the inventory. Includes nine standard report options. (Packs for up to 100 units available.)

Tally Systems Corp., P. O. Box 70, Hanover, NH 03755; 800-262-3877 or 603-643-1300.

PC911 1.0, \$49.95

A diagnostic utility that goes to work when you boot your system, looking for changes, problems, and potential conflicts. For example, PC911 can identify interrupt conflicts and recommend changes. Creates and maintains a configuration database automatically. Detects and reports configuration changes resulting from new hardware or component failure.

CyberMedia, 1800 Century Park E., Suite 1145, Los Angeles, CA 90067; 310-843-0800.

PC Certify 5.1, \$99

A comprehensive diagnostic utility for hardware and software, this program tests all PC/XT, 80286, 80386, 80486, PS/2, and other compatible PCs. Can differentiate hardware problems from software and configuration problems.

Landmark Research International Corp. (see listing for AlignIt, above).

PC-Doctor 1.1, \$129.95

Includes more than 200 diagnostic tests, system information functions, and utilities. Identifies interrupt (IRQ) conflicts and finds available IRQ lines, direct memory-address channels, and I/O addresses. Can diagnose networks and SCSI and IDE drives. Its Maximum System Load test performs burn-in testing. Includes context-sensitive help, an on-line manual, and virus protection. (OEM versions available.)

WaterGate Software Inc., 2000 Powell St., Suite 1200, Emeryville, CA 94608; 510-596-1770.

PC Probe 3.0, \$99

Puts your system through its paces with 150 tests evaluating a computer's motherboard, memory, video card, display, keyboard, serial and parallel ports, floppy controller and drive, and hard disk controller and drive. Memory test includes a bad RAM-chip locator. Offers a timed batch-mode feature allowing repetitive testing to track down intermittent errors. Results can be logged to a file, the screen, or a printer. Includes a set of parallel and serial loop-back plugs for hardware testing; connects the input and output pins on the port being examined. Also includes a version of IMSI's VirusCure utility (see the entry under "Antivirus Programs"). (Price includes two years of free quarterly updates, downloadable from a BBS.)

Landmark Research International Corp. (see listing for AlignIt, above).

Personal Measure 1.67, \$125 plus \$3.50 shipping

Running in the background, Personal Measure monitors the operation of your hardware and software and generates graphical and tabular reports showing the amount of time an application spends accessing your PC's microprocessor, disk drives, printer, ports, and key-

board. With this data in hand, you can identify bottlenecks, determine whether you need an upgrade, and compare system performance under various hardware and software scenarios. (A Windows version, Personal Measure/RT 1.67, is available for \$495. Site licenses and quantity discounts available.)

Spirit of Performance Inc., 73 Westcott Road, Harvard, MA 01451, 508-456-3889.

Power Meter 1.8, \$99.95

This suite of benchmarks tests overall system performance, offering reports on areas such as memory, the CPU, the video system, and drives. The program's CPU and memory check includes industry-standard ratings for clock speed, MIPs, and EMS speed, as well as results of Dhrystones, Whetstones, and Sieve of Erastosthenes tests. Analyzes disk performance by conducting track-to-track tests and computing mean seek time, data transfer rate, time to open and close a file, and more. Also includes a battery-duration test for laptops. Results may be output for graphing. (Power Meter is included in the QAPLus/FE package mentioned below or may be purchased separately.)

DiagSoft Inc., 5615 Scotts Valley Dr., Suite 140, Scotts Valley, CA 95066; 800-342-4763 or 408-438-8247.

PrinTrace, \$79

PrinTrace offers 11 printer tests, including loop back and print file; it works with more than 600 laser, dot-matrix, ink-jet, and daisywheel models with parallel, serial, or Novell NetWare interfaces. PrinTrace features a graphical interface on Hercules, EGA, and VGA monitors and also supports the mouse. (Windows compatible.)

Intelogic Trace Inc., P.O. Box 400044, San Antonio, TX 78229; 800-531-7186 or 210-593-5700.

QAPLus 4.72, \$159.95 QAPLus/FE 5.13, \$349.95

A sophisticated suite of diagnostic tests, QAPLus checks CPUs, RAM, video adapters, serial and parallel ports, floppy drives and hard drives, CD-ROM devices, keyboards, joysticks, mice, speakers, and more. The program's System Information module reports on interrupt assignments; the ROM BIOS, LPT, and COM interrupt addresses; device drivers; and controllers. The System Performance Test reports the results of CPU, video, and hard disk benchmarks. QAPLus also includes a file editor for modifying your computer's setup files, a QAMatch module for comparing different versions of setup files, the ReachOut Host remote-control program, and Symantec's virus-detection technology.

QAPLus/FE is an enhanced version of the same set of tests. In addition to the features outlined above, it offers the ability to specify parameters for each test, the ability to save test settings as a script for future use, the ability to test certain SCSI controllers, and a set of loop-back plugs for conducting port tests.

The QAPLus/Report module lets you view and log test results, as well as send output to dBase files. A Power Meter performance-analysis module includes 20 benchmark tests.

DiagSoft Inc. (see listing for Power Meter, above).

RAMexam, \$29.95

RAMexam tests conventional and extended memory and identifies defective or damaged areas. It uses a "consistent fault" model, employing specific sequences of bit patterns designed to detect six individual types of memory failures, based on the premise that some bits fail only when certain other bits are changed to particular values. You may configure RAMexam to test memory daily, weekly, monthly, or according to a user-defined schedule. You also may choose the degree of testing, from a quick check of a few seconds' duration to a more exhaustive overnight examination. (Compatible with 386MAX, BlueMax, QEMM, NetRoom, and DOS's memory management.)

Qualitas Inc., 7101 Wisconsin Ave., Suite 1386, Bethesda, MD 20814, 800-733-1377 or 301-907-6700.

Remote Rx 2.5, \$129.95

Remote Rx conducts a series of comprehensive hardware tests on local and remote PCs, one at a time or in batches. The program's communications facility lets you exchange files or test remote systems via modem. Determines benchmark performance for individual components or entire systems and can display information on interrupt and DMA use. Lets you edit CMOS code, CONFIG.SYS, and AUTOEXEC.BAT via remote link. Newest version upgraded for DOS 6.x compatibility.

RenaSonce Group Inc. (see listing for InfoSpotter, above).

SB Pro 2.3, \$149.95

Because this self-booting utility has its own operating system, it can run on all Intel-based hardware. Compatible with MS-DOS, OS/2, Unix, Xenix, Pick, and other operating systems. Isolates hardware problems from software-configuration problems by bypassing all existing operating systems and applications. Tests memory to locate bad chips and SIMMs. Newest version upgraded for DOS 6.x compatibility.

RenaSonce Group Inc. (see listing for InfoSpotter, above).

System Sleuth Professional 4.0, \$169

This system-setup, troubleshooting, and diagnostic utility performs extensive tests of a computer's motherboard, disk drives, memory, printers, keyboard, and video system. It finds defective memory chips, locates bad surface areas on a hard disk, isolates malfunctioning serial or parallel ports, and compares system performance against that of other machines or configurations. Displays the details of system interrupts, I/O ports in use, memory configuration, and more. Also lets you design a menu offering only a partial selection of specific tests.

Dariana Software (see listing for Conflict Finder, above).

System Speed Test 2.0, \$29

An industry-standard system benchmark that checks the speed of the CPU, math coprocessor, and video

adapter. Includes MOVE, which lets you transfer files quickly between directories instead of copying them and then deleting them from their old locations; FILLER, which creates a filler file of any size that you can use in disk tests or to overwrite files you've deleted from a disk; and REPRINT, which lets you reprint multipage documents from the DOS prompt, without operator intervention.

Landmark Research International Corp. (see listing for AlignIt, above).

Trackmate Diagnostics and Disk Drive Maintenance System

A diagnostic utility and data-protection system for floppy drives, this package tests to see whether cleaning is required; if so, it recommends the length of the cleaning program. It diagnoses key drive functions, including head condition, and also generates monthly reports on diagnostic and cleaning activity for each drive. TM563, \$24.95, includes cleaning solution and cleaning disks for 3.5-inch or 5.25-inch drives. TM544, \$29.95, handles both 3.5- and 5.25-inch floppy disks and drives.

Trackmate America Corp., 5750 Rufe Snow Dr., Suite 130, North Richland Hills, TX 76180; 800-486-5707 or 817-281-1694.

The Troubleshooter 3.22, \$299

A self-booting diagnostic utility that works with personal-computer hardware running under any operating system, including DOS. Tests the CPU, math coprocessor, CMOS, RAM, hard drives and floppy drives, video monitor and display adapter, I/O ports, and more. Includes routines that are compatible with the Pentium processor and external cache memory.

AllMicro, 18820 U.S. Highway 19N, Suite 215, Clearwater, FL 34624; 800-653-4933 or 813-539-7283.

WindowRAM, \$69.95 plus \$5 shipping

Run as either a memory-resident or standard program, WindowRAM is a programmable system-analysis utility. Various commands let you view, edit, and unassemble memory areas, including upper, expanded, and extended memory. Mapping identifies the function of any memory block. A built-in language lets you write your own decoding, troubleshooting, diagnostic, and debugging programs. Also included is a template library with more than 60 programs analyzing all aspects of your system, including BIOS, CMOS data, interrupt-vector table, and more. (Windows compatible. Texas residents add \$3.30 sales tax.)

WindowDOS Associates, Box 300488, Arlington, TX 76010; 817-467-4103.

DISK UTILITIES

Because we rely so heavily on hard disks, want to know so much about them, and worry so often about their health, disk-management software is understandably one of the most popular and diverse categories of PC utilities. The number of available products makes

all the more sense when you consider that only lately has MS-DOS included disk-management capabilities.

Among the most important chores that DOS failed to address until recently is optimization—tasks such as defragmentation (storing the pieces of a file in contiguous disk locations) and disk scanning (detecting and correcting problems on a disk's surface). Another feature only lately included in DOS is disk compression. Unlike file-compression programs, which squeeze individual files for archiving or to reduce telecommunications time (see "Archivers and Compressors" on page 62), disk compressors operate in the background, compressing and decompressing each file as it is stored and retrieved.

A third category of disk utility, disk-caching software, improves computer performance by storing in memory the most recent and most often requested data. This speeds up disk-intensive operations, because your system accesses internal memory faster than it does a hard disk drive.

Disk-Caching Programs

Although disk-caching software goes back a number of years, its use became widespread only comparatively recently, as more users migrated to high-end DOS programs, Windows, and Windows software. Such programs tend to access your hard disk frequently, slowing down performance noticeably. The right disk-caching utility speeds operation by pulling more information into RAM than your program needs. Often, the next time your program asks for data, it can find what it requires in memory.

Many caching programs reduce disk accesses further by predicting which data an application will ask for next and storing that information in memory, too. Naturally, the longer such software works with a given set of applications, the better it can predict what information to store in its cache.

The concept is simple, but obviously not all disk-caching software is alike. Consider the following issues before investing in a third-party disk cache.

First, ask yourself how the product you're considering stacks up against DOS's disk cache, SMARTDrive (called SMARTDRV.SYS or SMARTDRV.EXE). One advantage of this program is that when you upgrade to a DOS version that includes SMARTDrive, DOS's Setup program installs the disk cache. As you look at alternatives to SMARTDrive, compare how much control you have over caching: the amount of memory you

may dedicate to the cache, the size of the read-ahead buffer, and the amount of the cache moved at one time.

If you have a high-density drive with removable media—removable hard disks, Bernoulli disks, or optical disks—make sure your disk-caching utility can detect when a platter is removed from the drive. Most modern packages, including SMARTDrive, can do this, but some that were designed around fixed drives can't. If your cache can't detect disk changes and you switch disks before the data in RAM is saved to disk, when memory is flushed, the cache information overwrites data on the second disk.

You should also know how your caching program writes information to disk. Many caching programs speed up operation by caching writes: storing data in RAM as long as possible during a write operation. Because your application doesn't have to wait continually wait for disk writes, programs execute faster. Later, when you are accessing a menu or typing on the keyboard, the utility writes the data to disk. You should be able to disable this feature or, at least, flush the cache on demand. DOS 6.2's SMARTDrive lets you do both.

(See also "DOS Shells" on page 59 and "Multipurpose Programs" on page 68; many utilities in these categories include caching features.)

Cache86 4, \$49.95 Cache86 5.01 for Windows and DOS, \$89.95

The Cache86 4 program can load into high memory. Compatible with MFM, RLL, ARLL, IDE, ESDI, and SCSI drives. Includes write-back and write-through options; lets you disable utilities and flush to disk the contents of the cache. Includes the COREtest benchmark program and a memory-map utility. (Windows compatible.)

Version 5.01 for Windows and DOS, a fast BIOS-level hard disk cache, replaces Microsoft's SmartDrive, supplied with both DOS and Windows. It installs automatically under Windows and features the ability to switch between the DOS command line and Windows' graphical interface without crashing. Monitors Windows, mouse, and keyboard events. (Optimized for DOS 6.x. Compatible with Stacker, SuperStor, DoubleSpace, and XtraDrive compression. Supports sound boards.)

The Aldridge Co., 2500 CityWest Blvd., Suite 575, Houston, TX 77042; 800-548-5019 or 713-953-1940.

Flash 10.5, \$69.95

This compact utility creates and configures a cache that may contain as much as 32MB of data. Installs in expanded or extended memory, or in a combination of the two. The Flash-Keys utility adjusts the initial delay time and repeat rate of a keyboard, letting you speed up response time. Flash-Keys can also clear the keyboard buffer. Includes a memory manager, a TSR manager, and diagnostic utilities. Compatible with Windows and networking environments, as well as with

nonstandard drive formats. Newest version of the program also handles CD-ROM drives.

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

The Norton Speedrive 4.0, \$99

Known formerly as Speedcache, this intelligent caching utility is compatible with CD-ROM drives and removable media as well as hard drives; also supports disk compression. Operating in the background, it monitors your PC's resources and adjusts memory use automatically for maximum efficiency with each operating system and storage device. Speedrive also includes options to fine-tune cache performance drive by drive, during and after installation. (Windows compatible.)

Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

Now! 6.1, \$29.95

A menu-driven disk-caching utility offering read prediction, the ability to write information to the cache on demand, and fast data read-through. You may change parameters from a simple menu and display cache use from the program's report feature.

TeraTech Inc., 100 Park Ave., Suite 360, Rockville, MD 20850; 800-447-9120 or 301-424-3903.

Super PC-Kwik 5.1, \$79.95

A disk-caching program that improves a drive's read/write performance. Lets you configure software to delay disk writes to enhance speed even more. Detects applications using virtual-control-program interface (VCPI) and DOS protected-mode interface (DPMI) memory, lending memory to them as they need it. Included with PC-Kwik Power Pak (see entry under "Multipurpose Programs").

PC-Kwik Corp. (formerly Multisoft Corp.), 15100 S.W. Koll Parkway, Beaverton, OR 97006; 800-274-5945 or 503-644-5644.

Disk Compressors

These days, standardization and user interfaces make software generally easy to use, but most "friendly" programs require shocking amounts of disk storage. The full-fledged version of a typical word processor or database, for example, may occupy 15MB or more of disk space. No wonder some suppliers no longer stock 250MB drives because they consider them too small.

Does that mean you must replace small or modest hard disks with more spacious models? Not if you're willing to use a disk compressor. Most disk-compression utilities double the amount of information you can put on a disk, turning an 80MB disk into the equivalent of a 160MB disk, for example.

How do they do it? Each compression program operates differently, but in general they double storage by creating

a logical disk partition holding a single "container" file. On a 40MB disk, the container typically holds 35MB; on a 150MB drive, the container holds about 140MB. If the hard disk is drive C, the container file is assigned as drive D.

When the system boots, a compression driver is loaded from the boot drive; this software logically swaps drives C and D, and the container file is opened for I/O as drive C. A memory-resident driver captures disk I/O requests for drive C, compressing and decompressing data on demand.

Sounds good, but disk compressors do have one shortcoming: Defragmentation software, surface scanners, and other disk-maintenance utilities probably won't work properly with a compressed drive. Luckily, many disk compressors include their own versions of such applications. You'll have to use conventional disk-maintenance utilities on the uncompressed portion of the drive, though, or you might lose data.

DoubleDensity, \$79.95

This hard disk compressor, which nearly doubles disk capacity, offers both on-the-fly background decompression and password protection. It uses "pseudo partitions" as large as 250MB, even with most disk caches. Compatible with all DOS commands, including DOS 5 commands for loading programs into high memory. Doesn't require you to reformat your hard drive.

Abacus Software Inc., 5370 52nd St. S.E., Grand Rapids, MI 49512; 800-451-4319 or 616-698-0330.

DoubleDisk Gold 6.0, \$99.95

Capable of more than doubling the capacity of your hard drive, DoubleDisk creates a hidden file that DOS treats as an extended drive. You may choose between automatic installation, with compression of all existing files, or manual installation, during which you first create the compressed volume in your free hard-drive space, then copy the files to be compressed. DDIR shows a directory listing, displaying compressed size and percentage reduction beside each filename. Allows up to 10 extended drives, each containing as much as 256MB. Newest version features support for removable media, built-in disk defragmentation, RAM-disk support, support for compressed partitions with a capacity as large as 512MB, automatic conversion of DoubleDisk version 2.6 files to 6.0 format, enhanced disk repair, and disk-access speed equal to normal DOS retrieval of uncompressed files. (For use with DOS 5 and earlier. Windows compatible.)

Vertisoft Systems Inc., Transamerica Pyramid, Fourth Floor, 600 Montgomery St., San Francisco, CA 94111, 800-466-5875/803-295-5875 (customer service), 800-535-5859 (orders), or 415-956-5999.

Stacker 4.0 for Windows and DOS, \$149

This automatic disk-compression utility more than doubles a disk's storage capacity. Lets you maximize

system performance by adjusting the speed and compression ratio, thus changing Stacker from a speed-oriented compressor to one that squeezes data 10 percent more.

Lets you password-protect "stacked" drives to prohibit users from writing information to the disk. Its Stacker Anywhere feature lets you read from and write to floppy disks on any system, even drives on which Stacker is not installed. Newest version includes an automatic-save feature that maintains duplicate sets of both DOS and Stacker file system information in an uncompressed state. (Network compatible. Site licenses available.)

Stac Electronics, 5993 Avenida Encinas, Carlsbad, CA 92008; 619-431-7474.

Disk Optimizers

Before the IBM PC came along, some personal computers (such as the early CP/M machines of the late '70s) required you to specify the number of consecutive bytes or sectors you needed when creating a file. If the file grew at all and you needed more space, you had to specify a new file and a new size.

This procedure was troublesome sometimes, but it had one big advantage over DOS's system: It kept all files together in contiguous disk space, which improved the speed of disk I/O. DOS manages file size automatically, but when the parts of a file are scattered over the disk, the file allocation table and directory must work together to tell DOS where to pick up all the pieces. That takes time.

Disk optimizers solve the fragmentation problem, scanning your disk and moving data around until all files are stored contiguously. They may do other things, as well: optimize a drive's interleave factor, sort files and directories, and perform diagnostics. Gazelle Systems' OPTUNE, for example, handles all three functions.

Another strong contender is Gibson Research's SpinRite 3.1. Marketed as a "nondestructive hard disk low-level reformatter," it includes other diagnostic and optimization features. Of course, you can't talk about optimizers without mentioning the utilities bundled with DOS 6.x. Versions 6.0 and later include DEFRAG, a reasonably capable defragmenter; version 6.2 includes the ScanDisk surface scanner.

Perhaps the most important aspect of selecting a disk optimizer is ensuring that it works flawlessly with your hardware and DOS. Most defragmenters know when they can't perform a given task, but if your hardware or software configuration is out of the ordinary, don't buy an optimizer without seeking counsel from dealers, other users, the producer of your software, and the

manufacturer of your hardware. And remember not to use an ordinary optimizer on compressed disk volumes. Unless a utility is designed to work with disk compressors, it will probably wreak havoc with your data. In addition, you may have problems using general-purpose optimizers with removable media, such as the SyQuest removable hard drive or Bernoulli disks.

Disk Manager 6.0, \$124.95

This hard disk installation utility lets you partition standard and nonstandard hard disks for DOS use while allowing up to 24 partitions per disk. Lets you partition disks with more than 1,024 cylinders (DOS's limit), install a maximum of four operating systems per drive, and map surface defects using bytes-from-index information provided by your drive's manufacturer.

OnTrack Computer Systems Inc., 6200 Bury Dr., Suites 15-19, Eden Prairie, MN 55346-1737; 800-752-1333 or 612-937-1107.

Disk Optimizer Tools 5.0, \$49.95

A disk-defragmenting utility that rearranges files so that the data each one holds is stored contiguously. Also recovers files from reformatted disks. Newest version supports DoubleSpace and Stacker compression.

SoftLogic Solutions Inc., 1 Perimeter Road, Manchester, NH 03103; 800-272-9900 or 603-627-9900.

Drive Rocket 1.13, \$39.95

A software device driver that improves data-transfer rates for most IDE drives. It works by enabling the IDE drive to read several sectors of data at a time. (Typically, IDE drives read only one sector at a time.) Also includes drive-performance utilities to analyze your system and produce benchmark reports. Requires 3K of RAM; may be loaded into upper memory.

OnTrack Computer Systems Inc. (see listing for Disk Manager, above).

DrivePro 2.0, \$99.95

This hard-disk installation and configuration utility supports drives with more than 1,024 cylinders. Also permits you to install several drive types in the same system. DrivePro stores custom drive parameters with the CMOS data on your hard disk for easy recall and updating. Conducts low-level formatting and sets interleave. Includes virus detection and eradication.

Micro House International, 4900 Pearl East Circle, Suite 101, Boulder, CO 80301; 800-926-8299 or 303-443-3388.

FastTrax 5.0, \$70

A disk optimizer that lets you store frequently used files in the tracks nearest the File Allocation Table (FAT), ensuring fast access. Includes FastInfo, an option that tells FastTrax to check itself for virus infection. Defragments any DOS disk, no matter the size or number of files it contains. Operates with as little as one free disk cluster, although performance is improved

with additional free storage. During disk optimization, the program attempts to place each file within disk-cylinder boundaries, further reducing head movement during reads. Includes power-failure protection logic to reduce the chances of data loss if the power fails during optimization. Lets you purge files by writing zeros on all free clusters. (Windows and OS/2 compatible.)

FastTrax International, 880 Ensenada Ave., Berkeley, CA 94707; 510-525-3510.

OPTune 1.4, \$99.95

This maintenance-and-repair utility for hard disks defragments disk files and sorts files so that their placement on the disk corresponds to that provided in the disk directory. Finds and marks bad disk sectors and optimizes your disk's interleave setting, ensuring faster operation. Includes Gazelle Systems' Q-Menu, a password protected menuing system.

Gazelle Systems, 305 North 500 W., Provo, UT 84601; 800-786-3278 or 801-377-1288.

SpinRite 3.1, \$89

SpinRite is a disk optimizer, low-level formatter, and defect-detection and -repair utility. Conducts a low-level format of a hard disk while leaving all data in place, letting you "refresh" the low-level format information without backing up and restoring data already there. Scans the disk surface and locates and marks all bad or questionable areas to prevent data loss owing to surface deterioration.

Analyzes and adjusts the hard drive's interleave factor for optimum performance and displays diagnostic information in a series of on-screen tables. PARK.COM lets you "park" the drive's read/write heads over a data-free "landing zone" when not in use.

Gibson Research, 35 Journey, Aliso Viejo, CA 92656; 800-736-0637 or 714-362-8800.

DOS COMMAND REPLACEMENTS

One reason that Windows has caught on is that many users don't like having to remember and type correctly the 70-plus DOS commands at their disposal. Windows has some problems of its own, however—most notably a hunger for hardware. DOS command-replacement utilities offer the best of both worlds, improving ease of use while making few demands on hardware.

For instance, wouldn't it be nice to type commands that sound like English—phrases such as "back up my drive C to floppy"? That's the idea behind Easy-English DOS from Natural Language Solutions. Other utilities in this category approach the problem in different ways, but all offer relief from having to type cryptic names.

JP Software's 4DOS, for example, enhances some DOS commands and makes the command line easier to use. For example, you can issue a DIR command under 4DOS and get a directory

displaying files with different extensions in different colors. 4DOS and other products like it also add new commands to DOS's repertoire, letting you use command aliases and the like.

If you need help recalling DOS commands or if you want to help someone else learn DOS, one of the utilities listed here can probably help. (For more information on software that goes beyond command-line enhancement, see "DOS Shells" on page 59.)

4DOS 5.0, \$69 plus \$6 shipping

4DOS is an alternative command processor that also offers enhancements to DOS. It can conduct operations such as copying, erasing, and moving files on entire sub-directory trees, and it lets you remap the keyboard and design keyboard aliases. Displays directories in various colors, using different colors for files with different extensions, and provides an on-line help system. Enhances existing DOS commands, such as DIR, providing greater versatility without requiring you to spend a lot of time learning new syntax. Latest version offers new batch-file features, including commands for block-structured logic, AND and OR operators, nesting up to 15 levels deep, box and line drawing, and color text for menu and screen creation. (Network compatible. OS/2 version, 4OS2, also available, \$69; \$89 bundled with 4DOS.)

JP Software Inc., P.O. Box 1470, East Arlington, MA 02174; 800-368-8777 (orders) or 617-646-3975.

Advanced Batch Commands 2.0, \$49.95 plus \$5 shipping

Advanced Batch Commands offers more than 60 items, including perpetual calendar, math and trigonometric functions, string functions, mouse support, and creation of text-input windows, buttons, and menus.

Merlin Software Development Co., 4517 Trafalgar Ave., Juneau, AK 99801; 800-770-2959 or 907-790-2959.

Back-to-DOS 3.0, \$69.95

This memory-resident alternative command processor pops up from within any application, temporarily suspending the application, saving all data to disk, and returning you to the DOS prompt. You can then run other programs or type DOS commands. When you type EXIT to return to your original application, Back-to-DOS refreshes the screen and resets all data values. Replaces DOS's default command processor, COMMAND.COM, with another program that permits pop-up operation.

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

BAX 2.0, \$15 with print manual, \$10 with on-line manual only

This interpretive language lets you write either stand-alone programs or batch files up to 500 lines long. Capabilities include string-manipulation functions, line editing, output to screen coordinates (for menu building), structured loops, and internal and external subroutines. File I/O is ASCII text only. Logic is single-line if/then/else

and multiple testing. The BAX disk contains sample programs. Version 1.1 of the program is available as shareware from America Online or CompuServe.

Fairware, P.O. Box 232388, Sacramento, CA 95823; 916-421-9914.

Builder 2.0, \$149.95
MoreBuilder, \$69.95
SuperBuilder, \$69.95
BuilderTools, \$69.95
WipeOut!, \$39.95
Workbench, \$39.95

Builder is a programming language featuring more than 200 commands using English-like syntax; it also supports all DOS batch commands. Builder includes a full-screen text editor, on-line help, and drop-down menus. The language is particularly adept at creating compact front ends, complete with encrypted passwords, hot-key activation, user prompts for keyboard input, and drop-down, pop-up, or light-bar color menus.

MoreBuilder is a library of 100 additional commands; SuperBuilder includes 45 advanced functions, including dialog-box creation and a variety of number formats. BuilderTools is a collection of approximately 20 stand-alone utilities for use with Builder-created programs; functions include number conversion and trigonometric calculation, drive serial-number checking, and listing archive file contents.

The WipeOut! collection features sound and video effects for Builder applications, including 25 screen wipes, preprogrammed sounds, and sound programmability. Workbench lets you compile and link Builder applications using external libraries or multiple source files with one keystroke. It comes with an editor but is compatible with other ASCII editors.

Hyperkinetix Inc., 18001 Irvine Blvd., Suite H, Tustin, CA 92680; 714-573-2260.

CPYAT2PC, \$49 plus \$5 shipping

This file-copy program lets your AT's high-density 1.2MB drive write to a 360K floppy that can then be read reliably by 360K drives on PCs, XTs, and compatibles. (Normally, 360K drives can't read 360K floppies written by a 1.2MB drive.) CPYAT2PC prompts you for additional disks when copying a group of files totaling more than 360K and also provides a utility called Split, which segments files larger than 360K (with subsequent restoration of the file on the destination system). Another included utility, 4MAT360, ensures that 360K disks formatted on a 1.2MB drive will be compatible with 360K drives.

Microbridge Computers International Inc., 655 Skyway, Suite 122, San Carlos, CA 94070; 800-523-8777 or 415-593-8777.

EasyEnglish DOS 1.0.1,
\$49.95 plus \$5 shipping

As a natural language processor, EasyEnglish DOS interprets English commands and translates them into "DOS speak." You teach the program your terminology so that you don't have to remember DOS's arcane terms and commands. If the phrase "current drive" gives you trouble, for example, you may call it "this drive" instead. If you want to perform an operation on all drives in the system, you might use "all disks."

Compatible with standard DOS; when you want to send an EasyEnglish command at the DOS prompt, you preface it with a dollar sign. Includes on-line help and comes with a number of built-in commands designed to make DOS easier to use.

Natural Language Solutions, 166 East 61st St., Suite 17-G, New York, NY 10021; 800-327-9868 or 212-752-8351.

LIST Enhanced 1.8, \$99

This DOS file viewer can handle files in ASCII and a host of other formats, including EBCDIC and ZIP and other compressed formats. It displays any DOS file, searches for text, cuts and pastes, and prints information, using its internal filters to remove many formatting codes. The program's file-manager front end makes file selection and viewing easy. Supports files containing up to 500MB of information.

Buerg Software, 850 Petaluma Blvd. N., Suite F, Petaluma, CA 94952; 707-769-5478.

QueryDOS 2.0, \$49.95

QueryDOS offers improvements on a number of DOS commands. It lets you manage DOS directories an entire tree at a time, eliminating repetitious keystrokes. Lists files or directories by date, size, name, and more, in addition to sorting files physically on disk. Uses wildcard searches to find misplaced files and lets you move files to different directories with simple commands. Copies to floppy disks, hard disks, and their associated directory trees or can duplicate the directory tree without copying files.

Backus-Naur Inc., 920 Yonge St., Suite 200, Toronto, Ontario M4W 3C7; 416-323-0406.

Radix2 ADI, \$249

This DOS processor lets you combine several commands into a single operation. Displays detailed file statistics, disk size and free space, plus system clock. Lets you search several files for a particular text string. Offers a separate viewer for hexadecimal files, as well as a context-sensitive help system.

Radix2 Software Engineering, P.O. Box 621, Libertyville, IL 60048; 800-946-8086 or 708-549-6733.

DOS SHELLS

When you need more help than a command-replacement utility can provide, consider a DOS shell. What sets these programs apart is their use of menus or symbols to make manipulating your programs and data easier. Why use a DOS shell when you can buy Windows? For one thing, Windows requires some high-end hardware. If your machine has minimal memory, an older processor, or a small hard disk, Windows isn't for you.

There are several types of DOS shells:

• *Basic menu programs* present nested menus of options from which you

choose. Generally, such programs are text-based displays that require you to set up the menus. Magee Enterprises' Treeview, a program that offers a directory tree display for file management, falls into this class.

• *Enhanced menu systems* may build menus automatically and often include pull-down menus or enhancements, such as file and directory management. Gazelle Systems' Q-DOS 3 is one example of this type of shell.

• *Windows-like file managers* offer graphical user interfaces and additional utilities that enhance DOS functions. An example of this type of shell is Titus Communications' TitusDOS. It uses public domain ICO icon files and has a Windows-style screen.

• *Multifunction shells* may include features such as security, file viewing and searching, and password access. Shells of this type—among them Central Point Software's PC Tools Pro—are covered in "Multipurpose Programs" on page 68.

(If you're looking for a utility that substitutes for COMMAND.COM or some of DOS's individual commands, see "DOS Command Replacements" on page 58.)

+ Menu 1.6, \$29

This straightforward menu-building program lets you launch programs with a single keystroke. It provides up to 10 levels of password protection and also lets you hide menu options not open to the user. (Version for an unlimited number of network users, \$195.)

Abelson Communications Inc., 1685 Grand Ave., Suite 202, Baldwin, NY 11510; 516-546-2286.

Access Menu 1.0, \$39.95

A menuing environment for DOS commands and applications, Access Menu lets you designate as many as 112 applications for menu display. It organizes menu entries in groups, providing complete English names for groups and applications. The included DOS Help menu makes DOS commands easier to use.

Kinetic Corp., 240 Distillery Commons, Louisville, KY 40206; 502-583-1679.

AutoMenu 5.0, \$69.95

AutoMenu for Kids, \$29.95

AutoMenu 5.0's customizable menuing system lets you group files and applications any way you like. Performs DOS or network commands, runs batch files, and launches any application—even Windows. Lets you design system security, including encryption of menu files, full password protection, disabling of Ctrl-Break, and the like. You may establish various user levels, such as novice, intermediate, and advanced. Newest version features overlapping windows and up to 62 selections per menu. (Network version, \$299.95 per server.)

AutoMenu for Kids is designed for children ages 3 to 12; it features a graphical menu from which they can launch their favorite games or learning programs.

Magee Enterprises Inc., P.O. Box 1587, Norcross, GA 30091; 800-662-4330 or 404-446-6611.

CMFiler 5.36p, \$30

This file manager and hard disk utility provides a menu-driven display that lets you copy, delete, and tag functions. The basic screen includes a side-by-side, split-screen display of the contents of two directories or disks; this setup makes it easy to move and delete files and carry out other DOS commands. Other features include a built-in text editor/viewer, a notepad that lets you store remarks (up to 39 characters) on any file or directory, and a directory-tree module that lets you copy, delete, and move entire directory structures. Also includes a filename searcher, text finder, and PKWARE's utilities for compressing and decompressing files.

NoVaSoft, 3239 Riverview Dr., Triangle, VA 22172; 800-242-4775/713-524-6394 (Public Software Library orders, part number 10657) or 703-221-1471.

Command Repeat and Utilities 1.0, \$25

A customizable menu system permitting an unlimited number of menus, displaying as many as 100 selections each. You may also design submenus for batch files or an autobooting interface for children that omits file-access and file-deletion functions. In addition, the package features an automatic file locator; when you type in a filename, the program searches all drives to find the file and can copy the file to a specified drive. The software also includes a screen blanker, keyboard lockout, and a date/time display.

McDriven Software, 13735 Masterson Ave., Yuma, AZ 85367; 602-342-3943.

dCOM: The Directory Commander 4.01, \$59

The dCOM DOS shell and menuing program tags files selectively for copying, moving, deleting, or printing, or changes files' attributes. Copying may span multiple target disks; if the disk in drive A is full, the program uses the disk in drive B automatically. Also includes a macro programming system with user-configurable macro keys, a text editor, a print spooler, a screen saver, and event alarms. The package's log-in security system adds password protection. An Activity Log tracks user access and program use.

DAC Micro Systems, 40941 176th St. E., Lancaster, CA 93535; 800-776-1322 or 805-264-1700.

Direct Access 5.1.8, \$99

This menuing system for hard disks lets you select and execute applications with a single keystroke, eliminating the need to type repetitive and difficult DOS commands. Lets you establish your own multilevel menu structure or build a single-level system. Executes common DOS commands, such as COPY, MOVE, and ERASE, from the Direct Access menu. Offers virus detection and password protection and tracks the use of Direct Access facilities, including how often each program is used, when it is used, and by whom. A screen-blanking feature protects your monitor from screen burn-in. (Windows version, \$99; network version for an unlimited number of users, \$595.)

Fifth Generation Systems/Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

DirecTree 1.09, \$99

A memory-resident pop-up program that simplifies file retrieval and file management within DOS text and graphics applications. Graphics and menu screens help you locate and load files quickly, even those with complex pathnames or filenames. Lets you add 80-character notes to DOS filenames; searches 6,000 files per second, using as many as 99 custom search strategies. File-management functions remember which directories you're using. DirecTree's small memory requirement makes it compatible with most DOS applications; the ability to customize screen colors ensures that the pop-up screen contrasts with your existing programs.

Inside Technologies Inc., 3535 Dewey St., Boise, ID 83703; 208-336-8889.

DirMAGIC 3.0, \$39.95

DirMAGIC's three major components are Disk Viewer, File Manager, and Directory Comparer. Disk Viewer displays side-by-side tree diagrams of two disks, and also lets you manipulate the directories in the tree. File Manager lets you choose files for viewing by scrolling through a split-screen display that shows filenames on the left and the highlighted file's contents on the right. Directory Comparer offers another split screen displaying the contents of subdirectories and identifying files that are different or the same.

MJM Software Design, P.O. Box 129, Gleneden Beach, OR 97388; 800-690-4499.

DOS ToolBox 2.7, \$59.95

The DOS ToolBox hard disk manager provides a program launcher and menu-driven commands for copying, deleting, and moving files. MOVE lets you transfer files across subdirectories or drives. DOLIST lets you edit command lines; the full-screen editor, TEDIT, lets you read text files or create or modify batch files and programs.

Other utilities include the WHEREIS file locator, the NOBLINK color selector, the RAMMAP memory mapper, and the KBD keyboard-control module, which you can make part of your batch file.

Computer Tyme, 411 N. Sherman, Suite 300, Springfield, MO 65802; 800-548-5353 or 417-866-1222.

Drive-In Menu, \$49

Drive-In's menu interface gives you fast access to programs and DOS commands by mouse or keyboard. The program can accommodate as many as eight menu levels, with up to 20 items per menu in logical groups. Prompts for additional information may also be included. Menu building features easy, step-by-step setup with a minimum of typing and no scripts or compiler commands. (Network compatible. Windows version available.)

Safetynet Inc., 55 Bleeker St., Millburn, NJ 07041-1414; 800-851-0188, 201-467-1024, or 908-851-0188 (international division).

EZ-Menu 5.1, \$59.95

This menuing system offers an unlimited number of selections. Utilities include automated menu building, usage tracking and reporting, automated scheduled execution of programs, and four levels of encrypted password security. (Network version, \$399 per server.)

Progressive Computer Services Inc., P.O. Box 7638, Metairie, LA 70010; 800-628-1131 or 504-831-9717.

Genus Utilities, \$49

This DOS shell covers a number of bases, including directory and file management, file compression, and archiving. The program's file viewer lets you examine archived information without decompressing it. Lets you delete a directory and all subdirectories below it. Compatible with Stacker and DoubleSpace disk compression.

Genus Software Corp., 1625 Richards St., Salt Lake City, UT 84115; 801-272-8877.

ICS Master Menu System, \$50

A simple menuing system that lets you execute up to four DOS commands with a single keystroke. Lets you chain as many menus as necessary to build a custom system.

Integrated Custom Software Inc., 701 Hebron Ave., Glastonbury, CT 06033; 203-657-3339.

Le Menu 3.1, \$65 Le Menu Plus 1.1, \$65

Le Menu is a hard disk management system that lets you copy, delete, print, rename, encrypt, and find commands across directories. You may set up one main menu and four submenus. Utilities include a batch-file editor, password-protection scheme, a hide-file function, and audit trails. (Network version for an unlimited number of users, \$295.)

Le Menu Plus adds the ability to set up an unlimited number of menus and submenus. It also lets you switch among as many as 10 programs, execute programs and macros at a predetermined time, and copy or delete entire directories. Utilities include a screen blanker, an enhanced batch-file language, and a tracking program that can monitor keystrokes and user activity.

Automation Technologies, 2563 E. Willow Hill Dr., Sandy, UT 84093; 800-777-6368 or 801-944-0876.

MarxMenu 2.48, \$59.95

The MarxMenu menuing system and job-control language provide screen commands that let you create an unlimited number of nested menus, exploding windows, and a customizable screen blanker. Includes conditional "smart" menus that provide different options for different users or on different days of the week. Programming features include self-typing variables, multidimensional arrays, and an integrated compiler. (Network version, \$495 per server.)

Computer Tyme (see listing for DOS ToolBox, above).

Menu-EZ 1.12, \$39

A hard disk organizer and menuing system, Menu-EZ lets you call any application with one or two keystrokes.

Converts input parameters from several other menuing programs, which simplifies the process of converting to Menu-EZX from another menuing system.

EZX Publishing, 917 Oakgrove Dr., Suite 101, Houston, TX 77058; 800-800-2468 (orders) or 713-280-9900.

Menu Works Personal 2.0, \$39.95

Menu Works Personal lets you create menus for popular software automatically. Lets you access software features with a mouse, via the cursor keys, or by entering a keyboard letter. Includes a file manager, file locator, full-screen file editor, and screen blanker. Supports all major networking systems. (Site-license prices start at 50 percent off.)

PC Dynamics Inc., 31332 Via Colinas, Suite 102, Westlake Village, CA 91362; 800-888-1741 or 818-889-1741.

Navigator 1.0, \$29.95

This flexible menu generator lets a system manager create a custom shell for users. It features configurable hot keys you can assign to as many as 32 menu choices so that users can start applications with a single keystroke. Also provides password protection on individual menu items; control over the color, size, and location of windows; and the ability to capture and report user statistics.

Black Oak Computer Services Inc., 700 Barksdale Road, Suite 14, Newark, DE 19714; 302-737-3258.

The Norton Commander 4.0, \$99

The Norton Commander is a file manager, file viewer, and application launcher that lets you view, edit, copy, rename, move, and delete files from a user-friendly interface. A pull-down structure and function-key support let you easily set up and use menus that run applications and DOS programs.

A file-attribute editor and context-sensitive help further enhance ease of use. Lets you send E-mail, paper mail, faxes, and files automatically via MCI Mail and CompuServe. Finds files by name or contents and lets you view information in files created by most popular PC applications, including various graphics formats. Contains a screen blanker. Newest version lets you copy, move, and delete compressed files and includes built-in support for PKZIP 2.04x. The Commander Link module now lets you transfer files and directories between your laptop and a desktop PC via the parallel port (in addition to serial connection).

The Editor supports block operations and includes printing capability, letting you create documents and edit existing documents without leaving Commander. Quick View displays a list of files in one panel and the contents of any highlighted file in another panel; you may view files without loading the parent application. (Network compatible. Upgrades for registered users, \$39 plus shipping. Upgrades include a free copy of Norton Speedrive, a hard disk/CD-ROM cache for DOS and Windows; see entry under "Disk-Caching Programs.")

Symantec Corp. (see listing for Direct Access, above).

The Not-So-Fancy Menu System 1.0, \$25.95

This tool for system managers creates closed architecture menus for users. Menus can invoke EXE, COM, and BAT files, as well as other menus. Utilities include NUM.COM, which toggles the NumLock key on and off at bootup.

The Complete Machine, 5 Brunella St., Freeport, NY 11520; 516-868-7820.

PreCursor 4.1, \$96

This design system for creating menus allows unlimited menu selections, menu cloning, computer-use tracking, and a password security system. File-management utilities include Find Files, Tag and Sort, File Viewer, and a built-in backup system.

The Aldridge Co., 2500 CityWest Blvd., Suite 575, Houston, TX 77042; 800-548-5019 or 713-953-1940.

Program Manager Plus 2.1b, \$119.95

This DOS menu shell lets you call up any program with a single keystroke or a click of the mouse. You may create a series of menus, each with as many as 16 selections; a menu selection may invoke a submenu. The program uses a visual tree and file-search capabilities to build each menu system. Also lets you design help screens, activity logs, a screen blanker, and customized screens. Works with individual PCs or across a network.

Lassen Software Inc., P.O. Box 2319, Paradise, CA 95967; 800-338-2126 or 916-877-0408.

Q-DOS 3 1.4, \$79

A file and directory manager for hard disks, Q-DOS provides a pictorial directory map that helps you create, rename, and restructure subdirectories. To simplify file moving and copying, it offers a dual layout mode for displaying two subdirectory structures simultaneously. Lets you configure screen color and layout, edit file attributes, and more. Supports the mouse and is compatible with Windows 3.x.

Includes Gazelle Systems' Q-Menu, a password-protected menuing system. Newest version provides file viewers and a dual display showing a file list and directory map simultaneously.

Gazelle Systems Inc., 305 North 500 W., Provo, UT 84601; 800-786-3278 or 801-377-1288.

QuikMenu III 3.0H, \$89.95

This graphical shell handles file and program management. It lets you move, copy, rename, and delete files by dragging icons. Uses the DOS FIND command to ferret out a file or group of files located anywhere on a drive.

Other utilities include a log that records the amount of time each program is used, a telephone database and dialer, a macro editor, screen blankers, a calculator, and a daily and monthly calendar with notepad. An icon editor can import PCX images, as well as Windows icons.

Neosoft Corp. (formerly OSCI Software Development), 354 N.E. Greenwood Ave., Suite 108, Bend, OR 97701; 800-545-1392 or 503-389-5489.

StupenDOS 4.0, \$35

A programmable DOS shell with pull-down menus, this product features a point-and-shoot screen that lets you use the keyboard or a mouse to execute any DOS command. As you become familiar with the program, you may bypass menus with shortcut keys (which are also programmable). Lets you link data and program files by specifying which programs to run when data files with certain extensions are selected. Works with most DOS commands, as well as with PKZIP file compression. (Network compatible.)

PKWARE Inc., 9025 N. Deerwood Dr., Brown Deer, WI 53223; 414-354-8699.

Task Director, \$29.95

Task Director can create a menu that gives you access to applications on a hard disk. It lets you assign any DOS command to a function key, permits you to view a customized logo window and the date and time, and retrieves the last command entered on the command line. The menu editor lets you add, delete, and move applications.

Personally Developed Software Inc., P.O. Box 3280, Wallingford, CT 06494; 800-426-7279 (customer service) or 203-237-4504.

Tempest 2.1, \$18.95

A graphical shell for file and program management, Tempest launches programs when you click on its screen icon. Lets you move or copy files by dragging an icon to its new location. Includes TED, a graphical text editor; an icon editor for creating your own icons; and two screen blankers to prevent monitor burn-in.

Abacus Software Inc., 5370 52nd St. S.E., Grand Rapids, MI 49512; 800-451-4319 or 616-698-0330.

TitusDOS 3.06, \$69.95

This DOS shell and menuing system offers public-domain icons for Windows 3.0. Working from a Windows-like screen, you may launch programs and protect data with passwords. The program can format a disk; rename, delete, or copy a file; and conduct other operating-system functions, but it does so using TitusDOS routines. You may use the included editor, calculator, phone book, and calendar to edit system files, prepare memos, or track your daily activities. Lets you move and resize windows, use pull-down menus, and maximize and minimize icons in DOS just as if you were in Windows. Newest version also includes a spreadsheet and database designer.

Titus Communications Corp., 1001 Ross Ave., Dallas, TX 75202; 214-954-0630.

Total Access 2.5, \$129.95

Total Access is a compact menuing system and antivirus utility. The program creates user-friendly menus and a Windows-like DOS environment for novice users. Copies, moves, deletes, renames, and sorts files or subdirectories easily. Tools include editors for your hard disk's FAT, sectors, clusters, and directories. Experienced users may encrypt and decrypt files, alter file attributes, redefine the function keys, and protect their systems against virus attacks. (Product sells for \$109.95 when

purchased with the company's Flash disk cache; see entry under "Disk-Caching Programs" in the "Disk Utilities" section.)

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

Tree86 4.0, \$94.95

The Tree86 disk-management system copies, tags, sorts, and finds files. It can read more than 16,000 files in 2,000 subdirectories residing on one or more drives. Subdirectory options include Kill, Cut and Paste, Hide, Unhide, and Edit. Copies or moves a group of files to another drive. Search locates files containing a specified text string; you can then bring up the program's pure ASCII text editor to make changes.

The Aldridge Co. (see listing for PreCursor, above).

Treeview 1.1, \$25

A file-management utility that serves as a menuing system or shell interface. Helps to organize hard disk files, displaying them by date, size, name, or extension. Also lets you tag a series of files and then operate on them as a group, moving them, copying them, renaming them, and so on. Uses a menu-driven system to launch programs and issue DOS commands. Reads and displays the contents of as many as six directories and drives. Provides a graphical display of a disk's tree structure.

Magee Enterprises Inc. (see listing for AutoMenu, above).

Turbo Menu 5.6, \$39.95

A simple shell that can create menus automatically for nearly 1,000 programs. Each menu item is represented as a scrolling bar. Utilities include a file finder, ASCII text editor, user log, screen blanker, on-screen clock, and hard disk head-parking program.

Decisis Inc., P.O. Box 120481, Peoria, IL 61614; 309-655-0177.

WindowDOS 3.5, \$69.95

A menu-based front end that can pop up while you're running applications, WindowDOS automates many of DOS's common operations and improves on several others. Macro programming lets you perform file and directory operations with a single keystroke. You may move files from one subdirectory to another without copying them. Also included are an enhanced text editor, file viewer, search command, and format command. Security features let you hide and unhide directories, check for unwanted programs in RAM, and institute password protection. Archive Directory lets you view contents of archived files.

WindowDOS Associates, P.O. Box 300488, Arlington, TX 76010; 817-467-4103.

Wynd-DOS and Wyndshell 2.2, \$45

Wynd-DOS is a disk-management program; Wyndshell is a menuing utility. With Wynd-DOS, you may open as many as nine on-screen windows at one time, each containing different directory information. The program

copies, moves, renames, or deletes files with one command. Searches for files anywhere on the disk.

With Wyndshell, you may set up an unlimited number of menus and submenus, each of which may have as many as 26 options; an option may run a program or call another submenu. Passwords may be assigned to any menu option.

Wyndware, 1 Parker Place, Suite 308, Janesville, WI 53545; 800-475-1628 or 608-755-1628.

XTreeGold 3.0, \$149.95

A multipurpose file and disk manager. Its AutoBuild program generates a custom menu that automatically prepares more than 1,000 applications for launching. It copies, deletes, moves, and renames files and groups of files, using pull-down menus or single-keystroke commands; its undeletion command recovers deleted files. Views almost any file—including graphics files—in their native formats. Supports numerous graphics formats, including Windows 3.x bit maps, Microsoft Paint, AutoCAD, EPS, CompuServe GIF, Amiga, GEM, Z-soft PCX, TIFF, and WordPerfect WPG. Its file compression system supports ZIP archives; an ARC conversion utility is included. (Network version for 10 users, \$595.)

Central Point Software, 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, OR 97006; 800-445-4208 (customer service), 800-333-6561, or 503-690-8088.

FILE MANAGERS

One of DOS's most important tasks is managing the data and program files on your disks. But chances are DOS doesn't handle all the tasks you feel need doing. That's where file managers come in. Few users can get by without at least one of the five types of file-management programs: archivers and compressors, conversion programs, file-transfer utilities, graphics utilities, and search programs.

Don't confuse file compressors with disk compressors. Generally, file compressors aren't automatic. When you want to compress or decompress a file or a group of files, you issue a command that tells the utility what to do. (For information on disk compressors, which work in the background, compressing and decompressing data on the fly, see "Disk Compressors" on page 57.)

As their name implies, conversion utilities change a file from one data format into another. Certain applications, such as word processors, handle this type of conversion automatically, but many do not.

File-transfer utilities help you move files between two PCs when you have too much data to use floppy disks conveniently. They're also useful if you want to complete the transfer while using the machine for other things.

Search programs conduct a variety of functions, from looking through speci-

fied directories for filename patterns to scanning an entire hard disk for files containing certain sequences of characters. Such programs are invaluable for managing hard disk storage and for finding information stored in a variety of formats.

Graphics utilities let you view images; some also let you edit images and convert image files among different formats.

Archivers and Compressors

Have you ever wanted to throw all your useful "junk" into a trash compactor so that it will take up less space? That's hard to do, unless you're dealing with electronic junk. With the right type of data and a good file-compression program, you can shrink files to as little as 3 percent of their original size. At that rate, even a large file should fit on a floppy disk.

Each of the major vendors of PC file compressors—especially System Enhancement Associates, distributors of the ARC Plus utilities, and PKWARE, distributors of the PK series—claims that its programs feature better compression ratios, better user interfaces, and more features than competing products. But the fact is, all the major utilities work as advertised, provide safe data compression and archiving, and are easy to use.

One enhancement that all major compression utilities now provide is a menu-driven interface, so you no longer have to remember arcane commands. Many of these utilities also let you create self-extracting EXE files, which decompress when you type the name of the file. Self-extracting files are larger, but they have one big plus: You can pass them on to someone who doesn't have the compression software with which the file was created.

ARC Plus 7.12, \$89.95

This menu-driven compression and archiving utility can compress disk files by as much as 76 percent. Encrypts and password-protects archived files. Includes a program for building self-extracting files, as well as routines for decompressing files and for merging two archives. Lets you use the menu to select and run compressed programs stored in your archive, and tracks your progress with on-screen displays. Also lets you bypass the menu and use ARC Plus features directly from the DOS command line.

System Enhancement Associates Inc., P.O. Box 949, Nassawadox, VA 23413; 804-442-5865.

Compress It! 1.0, \$39.99

This real-time hard disk data-compression utility doubles your hard disk's storage capacity. The program

dynamically allocates disk space for compressed files, so that you don't have to set aside space for them. Uses only the amount of space required for current compressed files; as more data is added or removed, file requirements are changed accordingly. (Windows compatible.)

The Wizardworks Group, 3850 Annapolis Lane N., Plymouth, MN 55447; 612-559-5140.

CUBIT 4.0, \$49.95

A file compressor that shrinks individual files by as much as 70 percent. Supports popular application formats, including Lotus 1-2-3.

SoftLogic Solutions Inc., 1 Perimeter Road, Manchester, NH 03103; 800-272-9900 or 603-627-9900.

Data Compression Library 1.03, \$275

A collection of compression utilities for software developers, this package adds PKWARE's compression technology to applications, reducing storage requirements by 50 to 90 percent. Controls input and output from the calling application, providing seamless compressed storage. No run-time royalties required, but compressed files are not compatible with the company's PKZIP format.

PKWARE Inc., 9025 N. Deerwood Dr., Brown Deer, WI 53223; 414-354-8699.

DiskDupe 5.0, \$79

DiskDupe Pro 5.0, \$179

DiskDupeAuto Pro 5.0, \$379

This replacement for the DISKCOPY command duplicates, formats, and compares disks—fast. You may use DiskDupe to prepare distribution disks for intra-company use or for resale, as well as for day-to-day copying duties. Copies files across disk formats—from 5.25- to 3.5-inch disks, for example. Lets you read a source disk in a single pass and store its contents in RAM (or on a hard disk, if more room is required). You can then make multiple copies of the destination disk using the stored information. Lets you make copies without touching the keyboard; DiskDupe senses disk changes. If you're copying to two drives serially, DiskDupe senses the second drive.

DiskDupe Pro offers all the features of DiskDupe, plus support for third and fourth drives and 2.8MB disks. Lets you use double-speed drives (the disks spin twice as fast as in normal drives) to make multiple copies at high speed. Permits you to add a unique serial number to each disk you copy and print labels listing the disk's contents. Also lets you produce a set of disks by entering disk names into the program's disk editor.

DiskDupeAuto Pro has all the capabilities of DiskDupe Pro, but may also be used with autoloading disk duplication equipment.

Micro System Designs Inc., 10062 Miller Ave., Suite 104, Cupertino, CA 95014; 408-446-2066.

DOS File Tracker, \$14.95

Lists as many as 780 files at one time, including sub-directories. Creates disk catalogs by file type and prints disk labels and sleeve inserts. Highlights duplicate files,

writes DOS volume labels on any disk, and can identify each file with user-specific comments. Can also add security classification to designated files.

Personally Developed Software Inc., P.O. Box 3280, Wallingford, CT 06494; 800-426-7279 or 203-237-4504.

FileRunner 1.4, \$99.95

A backup, archiving, and file-synchronization utility that lets you transfer disk files among various PC platforms while maintaining overwrite and version control. Keeps the same file version on all PCs by conducting regular copy-and-restore operations. Tracks the latest version automatically and avoids overwriting changed files you want to keep. Helps reduce disk-storage requirements with automatic file compression, and maintains data and system integrity with Virex for the PC virus detection (see entry under "Antivirus Programs"). Lets you specify files to transfer by name or directory or transfer only modified files. (Windows and network compatible.)

MBS Technologies Inc., 4017 Washington Road, #4000, McMurray, PA 15317; 800-860-8700 or 412-941-9076.

Name That Disk, \$39.95

This label printer reads file information directly from a specified disk, displays it on screen, then prints the information in a variety of formats, including labels. Eliminates errors associated with copying disk information from the screen to a label manually. Each label includes the volume name, filenames (sorted by name, extension, or date), bytes used, bytes free, date and time the label was created, number of files, comments, and the date and time the file was last altered.

Power Up Software Corp., P.O. Box 7600, San Mateo, CA 94403; 800-851-2917 (orders) or 415-345-5900.

PKLITE 1.15, \$46

A file-compression utility for executable files, PKLITE compresses COM and EXE files in place, reducing storage requirements by 30 percent or more. Lets you compress most executable files, except those with internal overlays. Compressed files usually execute normally, but if problems occur, you can expand them with PKLITE. Professional option (\$146) generates nonexpandable programs for sale and distribution.

PKWARE Inc. (see listing for Data Compression Library, above).

PKZIP/PKUNZIP 2.04g, \$47

This popular off-line file-compression and -expansion utility compresses files for archival storage or for telecommunications. Builds self-extracting files requiring only slightly more storage space than ordinary compressed files and scrambles compressed files so that a password is required to expand them. Depending on file type, you may compress data from about 40 percent to as much as 97 percent. ZIP files may contain more than 8,000 individual files. Supports EMS memory. Newest version provides 15 percent more compression on average and runs twice as fast as version 1.1; in addition, it can create a ZIP file across multiple disks.

PKWARE Inc. (see listing for Data Compression Library, above).

PKZMENU 1.04, \$36

A menu-driven version of PKUNZIP (see entry immediately above). Displays lists of ZIP files and the individual files they contain. Lets you use pull-down menus to select and expand individual files within a ZIP file. Sorts files in as many as 14 ways. Supports a mouse and is compatible with networks and Quarterdeck Office Systems' DESQView (see entry under "Task Swappers and Multitasking Environments").

PKWARE Inc. (see listing for Data Compression Library, above).

Stash 3.0e, \$50

Stash compresses single or multiple files by 70 to 90 percent for storage or transfer across platforms. Program versions are available for various mainframe, DOS, Macintosh, Unix, and OS/2 systems; decompression features automatic data conversion. Stash can also create self-extracting files. (Site licenses available.)

Adlersparre & Associates, P.O. Box 403, Chesterfield, MA 01012; 800-795-9896 or 413-296-0252.

Utilities I, \$9.95

Compresses and expands files in place. Lets you create compressed backups and expand files to their original size.

Personally Developed Software Inc. (see listing for DOS File Tracker, above).

XtraDrive 3.0, \$79.95

A data-compression utility that doubles hard disk capacity by compressing data when you install the program. It compresses new files as you add them to your hard disk. Maintains the original drive name after the compression software is installed. Removing XtraDrive doesn't require you to reformat your hard disk.

Integrated Information Technology (IIT), 2445 Mission College Blvd., Santa Clara, CA 95054; 800-832-0770 or 408-727-1885.

Conversion Programs

A few years ago, it was impossible to load a word processing file into editor A if the file was created by editor B. Now that most mainstream packages recognize the data files of other popular applications, that sort of problem crops up less frequently. But today's software is by no means perfect. When an application doesn't recognize a file format you want to use, or its built-in conversion utility doesn't do a complete job, a stand-alone conversion utility can come in handy.

Another file-conversion task that is becoming increasingly important is that of exchanging data between platforms: porting PC files to workstations

or using mainframe computer files on PCs. Samkhyia Software's MacroPIK'r, for example, lets you download mainframe files to a PC and use the data directly in a variety of PC spreadsheets and databases.

Need something to handle Mac-to-PC conversion? Several programs have you covered. MacLinkPlus/PC from DataViz even goes so far as to retain text attributes during the conversion.

For sheer versatility, DBMS/Copy Plus from SPSS probably deserves the heavyweight title. It costs more than many others on the list, but it supports more than 60 file formats and is intended for cross-platform use.

AutoImport 2.1, \$189.95

Imports ASCII text reports from mainframes and PCs into spreadsheets and databases. Supports 1-2-3, Symphony, Excel, Quattro, dBase, and several other file formats. Translates headings, titles, percent signs, and other characters while eliminating control codes. Lets you create a template for repeated use. Runs from a menu or batch file.

White Crane Systems Inc., 8255 Overview Court, Suite 100, Roswell, GA 30076; 404-594-8180.

ConvertPerfect 1.0, \$49

A file-conversion utility that converts DOS and Windows word processing file formats to and from WordPerfect 5.1. (This technology is built into WordPerfect 6.0.) Also converts more than 40 file formats, including DCA/RTF, Microsoft Word, WordStar, Ami Professional, and Navy DIF. Lets you select a single file or groups of files for conversion; the software detects the source word-processing document automatically.

WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 800-321-5906 or 801-225-5000.

Data Junction Standard 4.2, \$99 Data Junction Professional 4.2, \$199

Data Junction Advanced 4.2, \$299
This family of menu-driven file converters is compatible with most popular PC-based applications. Converts data to and from dozens of popular databases, spreadsheets, accounting packages, and other applications. Can also handle ASCII, binary (EBDIC), and Btrieve files. The program's "hub and spoke" design lets you filter, edit, and convert files, reading data from one format into a common area before writing it to the specified target format. Conducts search-and-replace operations, case translation, or name-and-address parsing while the data is within the hub. The Professional version can handle more file types than the Standard version. The Advanced version handles still more file types.

Tools & Techniques Inc., 2201 Northland Dr., Austin, TX 78756; 800-444-1945 or 512-459-1308.

DBMS/Copy Plus 3.1, \$295

A high-speed file-duplication and -conversion utility that handles files from more than 60 popular DOS-

based products. Copies information among various applications, leaving the source file intact. Integrates data from a spreadsheet into a database and copies statistical information into a spreadsheet for further manipulation.

Maintains variable names, labels, and data attributes during the transfer. An integrated menuing system gives you easy access to program features or lets you issue commands at the DOS prompt. Data selection and filtering let you copy only specified data.

(At press time, the expected release date for version 4.0 was May 1994; it will contain new word-processing formats and work with current versions of Excel and Paradox.)

SPSS Inc., 444 Michigan Ave., Chicago, IL 60611; 800-543-2185 or 312-329-3500.

Doc-to-Doc 1.18m, \$69

A document converter for popular word processing formats, Doc-to-Doc translates single documents or entire subdirectories while maintaining text attributes and formatting. Lets you view files before converting them from "foreign" word processors. Also maintains a log of converted records to aid in debugging and tracking the conversion process.

MCS Group Inc., 2465 W. Chicago, Rapid City, SD 57702; 605-341-6755.

Filtrix-DOS 3.1, \$389

This file converter for publishing programs, editors, word processors, and typesetting programs uses a menu interface to convert documents from a wide variety of popular formats to DCA/RFT, Interleaf 3.5-4, Microsoft Word 5.5 and earlier, Word for Windows, WordPerfect, and XyWrite. Lets you customize conversions with automated search and replace (using a conditional wildcard, if necessary) and split files into smaller units. Can create tagged ASCII text (files in which you can add XyWrite-style codes for boldface, italics, and so on).

Blueberry Software, 260 Petaluma Ave., Sebastopol, CA 95472; 707-829-5443.

Image Alchemy 1.76, \$79.95 Image Alchemy PS 1.76, \$349

Image Alchemy translates among a variety of file formats, including PostScript, GIF, Hewlett-Packard PCL, JFIF, JPEG, Macintosh PICT, MacPaint, PCPaint, Targa, Windows BMP, and WordPerfect WPG. The program supports more than 50 file formats; 250-pixel limit. A JPEG compression option lets you fit a 2MB image on a single floppy disk. The Color Palette's options let you create your own high-quality color palette or match your image to an existing palette, for uniform distribution of colors across a series of images. (An MS-DOS 386 Enhanced Mode version, \$199.95, supports an unlimited number of pixels.)

Image Alchemy PS is a more sophisticated version of the program; it reads all Level 1 PostScript files and all but the most obscure Level 2 PostScript files. Converts color PostScript images to gray-scale, black-and-white, or color images with fewer hues. Supports more than 60 file formats, including TIFF, PCL, PCX, and Targa.

Handmade Software Inc., 48820 Kato Road, Suite 110, Fremont, CA 94538; 800-358-3588 or 510-252-0101.

Mac-in-DOS 1.2, \$99 Mac-in-DOS Plus, \$149

Macintosh-to-PC file-conversion utilities. Both programs let you read from and write to a Mac disk mounted in a PC drive. Also let you share data between popular applications running on PC and Macintosh systems, without connecting the machines. A shell-like interface lets you highlight multiple files for reading or writing, change directories or drives on the PC, or delete files. Version 1.2 is compatible with 1.44MB 3.5-inch disks only. The Plus version works with removable media as well as 1.44MB disks.

Pacific Micro Electronics, 201 San Antonio Circle, C250, Mountain View, CA 94040; 800-628-3475 or 415-948-6200.

MacLinkPlus/PC 7.5, \$199

This two-way Mac-to-PC file-conversion utility transfers data files among popular applications, using software that runs on both formats. The program's DOS Disk Mounting Utility handles DOS disks inserted into the FDHD SuperDrive, reading them from the Mac desktop or from within applications. Converted documents retain their original formatting and are fully usable once translated. Comes with an RS-232 cable and adapters for a direct connection between two machines.

DataViz Inc., 55 Corporate Dr., Trumbull, CT 06611; 800-733-0030 or 203-268-0030.

MacroPIK'r 1.5, \$35 plus \$5 shipping

You may use this file converter to translate mainframe reports into PC spreadsheet and database formats. Also translates files among PC-based applications, including ASCII, dBase II and III, various word processors, and more. Includes an editor for modifying the converted data, searching for specific information, or transposing spreadsheet rows and columns. Lets you create macros to automate many functions.

Samkhyia Software Corp., P.O. Box 13, Tamales, CA 94971; 707-878-2914.

Outside In 2.1, \$89

A pop-up data converter that translates data from more than 60 word processors, spreadsheets, and databases into formats other DOS programs can read. Imports all, part, or noncontiguous parts of files into other spreadsheets, communications packages, databases, E-mail systems, and other applications. Lets you view source files as they would appear in the original application.

Systems Compatibility Corp., 401 N. Wabash, Suite 600, Chicago, IL 60611; 800-333-1395 or 312-329-0700.

R-Doc/X, \$149

R-Doc/X (its name stands for "Revisable Document Exchange") converts word processing documents to different file formats. It's particularly useful if you're working with older file formats, such as WordStar, DisplayWrite, and MultiMate.

Performs conversion on native files, without the intermediate step of going to DCA/RFT or another such format. Supports more than 30 program formats.

(Special purchase price for R-Doc/X and WordPort, mentioned below, is \$195.)

Advanced Computer Innovations, 30 Burncoat Way, Pittsford, NY 14534; 716-383-1939.

Software Bridge 6.0, \$99

A file-conversion utility that converts files from more than 60 word processing, database, and spreadsheet programs into any of 30 user-selected word processing formats. After conversion, you may use the files in the target word processor, complete with original formatting, footnotes, tabs, fonts, margins, and headers. Also lets you search directories for specific text to determine which files you want to convert. Newest version supports WordPerfect 6.0.

Systems Compatibility Corp. (see listing for Outside In, above).

Word for Word Professional 6.0, \$149

Converts files among more than 90 different word-processing, spreadsheet, and database formats for PC and Macintosh systems. Converted files retain formatting features of the original, including indentations, tabs, columns, boldface, and underlining. Determines the type of source file automatically. File viewers let you see contents without running the application software. Multiple file tagging allows batch conversions of as many as 1,000 files per session. Newest version includes compound document converters (text and graphics) and a graphics-only converter that translates among 12 formats.

Mastersoft Inc., 8737 E. Via de Commercio, Scottsdale, AZ 85258; 800-624-6107 or 602-948-4888.

WordPort, \$149

This menu-driven utility converts text and formatting among different word processing file formats, sometimes supplying formatting that is missing in the original document. Converts as many as 1,000 files at a time and lets you convert files from several disks or directories in one operation. Its Autoselect feature automatically identifies files created by a given word processor and converts them. Lets you override and change almost 200 document features. Offers on-line help. (Special purchase price for WordPort and R-Doc/X, mentioned above, is \$195.)

Advanced Computer Innovations (see listing for R-Doc/X, above).

File-Transfer Programs

There's more than one way to skin a cat, as the old saying goes. Where moving large amounts of computer data is concerned, three methods come to mind. Probably the easiest of the trio is setting up a full-fledged network to handle the load. If you don't have a network, you can dial into a computer and conduct business over a telephone line, or you can link two machines and send data over a high-speed local connection.

That third choice is the job of file-transfer utilities. They let you attach two machines through serial or parallel ports and transfer data at about the same speed as you can save information to a floppy drive. Certain programs, such as Biologic's COMx, can even conduct this transfer in the background while you do something else in the foreground.

Some file-transfer programs, including Traveling Software's LapLink, also support modem transfers. Why use LapLink instead of your communications software? This program, and others like it, do more. For example, they can make the files in two directories on different machines identical, they may include a self-install feature to place the program automatically on a remote machine, and they support high-speed transfers through your computer's parallel port.

If you transfer data regularly between two desktop machines in the same office, you should consider a low-end network. Interface cards and network software are sufficiently inexpensive that they make for a cost-effective solution. On the other hand, if you have a notebook or laptop computer and need to share data with a desktop machine, one of the file-transfer utilities discussed here is probably a better choice.

COMx 2.0, \$59

This high-speed file-transfer utility works in the background, transferring files between two PCs at rates as high as 115,200 bits per second (bps) while other programs are running on both machines. Uses 4K of RAM and comes with a 32-foot modular cable.

Biologic Co., 7950 Blue Gray Circle, Manassas, VA 22110; 800-736-8088 or 703-368-2949.

Fastlynx 2.0, \$169.95

This menu-driven file-transfer program also functions as a file-storage and printer-sharing utility. Effects high-speed serial or parallel data transfers between two computers. Lets you run remote programs by accessing the attached computer's disk as a separate drive letter and print to the remote computer's printer as if it were attached to your machine. Transfers data via parallel cable (included) at speeds as high as 130,000 bps. With a serial cable (included), transfer rates reach 230,000 bps. (Compatible with Windows 3.x.)

Rupp Technology Corp., 3228 E. Indian School Road, Phoenix, AZ 85018; 800-852-7877 or 602-224-9922.

Frisbee 2.10, \$69.99

Frisbee lets you maintain the same environment on two computers by transferring data between them on one or more floppy disks. You create a set of disks on the source machine, carry it to the destination machine, and install the changes. Frisbee determines which files and directories were created, updated, or deleted, and copies them into a compressed archive on a floppy disk.

Reproduces all the changes you made on the first computer so that the two machines are synchronized. Useful for coordinating home and office computing setups.

Polyhedron Software Ltd., Linden House, 93 High St., Standlake, Witney OX8 7RH, United Kingdom; U.S. fax number 800-777-5519.

LapLink 5, \$169.95

A file-transfer program that can link computers through their serial or parallel ports or via modem. Transfers multiple files or even entire directories at speeds as high as 3MB per minute. Menu-driven interface displays directory tree and files of both machines simultaneously. Program can install itself on remote computers linked by serial cable or modem. Utilities include Synchronize, which makes the files in two directories identical; Batch, which automates repetitive file transfers; and LapLink Editor, which lets users view and edit files. A remote file-transfer facility supports more than 100 Hayes-compatible modems. Package includes a four-headed serial cable and a two-headed parallel cable. Newest version supports peer-to-peer transfer over Novell networks and features macro recording, a drag-and-drop file interface, and the ability to transfer hidden files.

Traveling Software Inc., 18702 N. Creek Parkway, Bothell, WA 98011; 800-343-8080 or 206-483-8088.

Multi-Scream, \$285-\$385 plus \$15 shipping

Linking computers via modem or serial connection, Multi-Scream lets you transmit DOS or Windows files from your PC to a Unix machine. Menu-driven. Supports screen-dump, Kermit, and ASCII file transfer.

Lone Star Software/Cactus International, 13987 W. Annapolis Court, Mount Airy, MD 21771, 800-525-8649.

Paranet 5.0, \$79.95

This file transfer utility for desktop and laptop computers makes it easy to transfer files, letting you access a remote computer's drives as if they were part of your local system. Provides a screen display listing the contents of both computers' drives and can back up data from one computer to another. Lets you install a remote "slave" program in the background so that you may load and save files on the remote system without the remote user being aware of it.

Adlersparre & Associates, P.O. Box 403, Chesterfield, MA 01012; 800-795-9896 or 413-296-0252.

Utilities III, \$9.95

A file-maintenance utility that sorts and reorders files by name or according to hexadecimal or ASCII values. Compares files to find differences. Program's error log signals need for preventive maintenance on disk drives.

Personally Developed Software Inc., P.O. Box 3280, Wallingford, CT 06494; 800-426-7279 or 203-237-4504.

Graphics Utilities

In an environment where multimedia applications and graphical interfaces

hold sway, manipulating and managing graphics images is becoming increasingly important. A product such as Application Techniques' Pizazz Plus or Inset Systems' HiJaak for DOS lets you capture all or a portion of an image on disk. You can then enhance it, edit it, crop it, or perhaps convert it for inclusion in a word processing or desktop-publishing document. HiJaak, for example, contains a routine that lets you capture an image in one application and convert it for use in a program that doesn't support the source program's file format.

Graphics-management capabilities vary widely from program to program. In addition to filling the obvious need for converting among various file formats, some programs let you print an image without using the application that created it. Other programs are even more creative. For example, PICBase from Pegasus Imaging lets you store captured graphics in several file formats and associate database-type text with them. You might use this kind of utility to catalog images you want to include in other applications, or you could treat the collection of images as a stand-alone database.

Other utilities in the graphics category, including LEAD Technologies' Leadview, compress captured images to save disk space—an important feature in any program of this type, because an uncompressed graphics image may require more than a megabyte of space.

Collage Complete 1.0, \$149

This screen-capturing and image-management package works in both DOS and Windows. A memory-resident screen-capture module lets you preview screens and save them directly in popular file formats, eliminating the need to convert them later. Conversion module handles TIFF, PCX, GIF, TGA, Windows BMP and Clipboard, and several other formats, as well as gray scales and 24-bit color. Lets you flip, rotate, invert, and combine images, or put them together in a video slide show.

Inner Media Inc., 60 Plain Road, Hollis, NH 03049; 800-962-2949 or 603-465-3216.

ColorView 3.2, \$29

A file-viewer and -conversion package, ColorView lets you work with 16-, 24-, and 32-bit Targa graphics and uncompressed TIFF image files. Offers a command-line option that lets you convert an input file to an 8-bit Targa file of a user-defined number of colors.

Pegasus Imaging Corp., 4350 W. Cypress St., Suite 908, Tampa, FL 33607; 813-875-7575.

GIFRead 6.0, \$49.95

This graphics-file image editor handles GIF, BMP, PCX, PIC, and TGA formats. Also includes printing, cataloging, and slide-show modules, plus three games.

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

HiJaak for DOS 2.1, \$189 HiJaak Pro, \$169

This graphics-conversion and screen-capture tool converts graphics file formats from raster to raster, vector to vector, and vector to raster, and from all supported formats to PostScript. Changes Macintosh and Amiga graphics files to PC formats and vice versa. Captures text and graphics screens, as well as LaserJet II-series printer and plotter output directed to LPT1. Supports 24 raster formats, 15 vector formats, and 25 fax devices. Pop-up capture module includes cropping, color remapping, and gray-scale manipulation. Requires a hard disk.

HiJaak Pro, the Windows version of the program, captures DOS screen conversions.

Inset Systems Inc., 71 Commerce Dr., Brookfield, CT 06804; 800-374-6738 or 203-740-2400.

InSet 2.2c, \$149

A memory-resident screen-capture and -editing utility that can merge images from a variety of drawing and other graphics packages into word processing or other text-based documents. You pop up the program to capture the current screen, draw lines, import symbols, and edit graphics images. Lets you add text in several different fonts and print captured images directly from the program.

Inset Systems Inc. (see listing immediately above).

Leadview 3.0, \$195

(\$99 current special pricing offer)

Offers graphics compression in JPEG file-interchange format or proprietary LEAD format. Converts graphics files to and from TGA, TIFF, BMP, and PCX formats; and to WMF and EPS formats. Lets you manipulate images by resizing, flipping, rotating, lightening, and darkening them. Compresses images to a fraction of their original size, maintaining much the same image quality. Offers compression ratios as high as 200:1. Also includes a screen-capture module and supports more than 30 VGA and super-VGA cards.

LEAD Technologies Inc., 8701 Mallard Creek Road, Charlotte, NC 28262; 800-637-4699 or 704-549-5532.

Pcxit 2.0, \$159

This raster-to-vector file-conversion and screen-capture utility converts scanned images and other PCX files to DXF (a popular CAD format) or FCD (FastCAD/ EasyCAD) format. Includes a memory-resident screen-capture utility for grabbing any screen image as a PCX file. Lets you edit or crop images and create a running presentation of PCX images.

Armasi Inc., 1 Progress Blvd., Suite 39, Alachua, FL 32615; 800-848-2955 or 904-462-2955.

PICBase 2.1, \$295

This database manager for images lets you view PCX, GIF, TGA, JPEG, and BMP image files. No limit on

number of records or image size. Lets you associate a free-form text field with an image. Sorts and searches on a variety of fields. A 386 or higher processor and 1MB or more of extended memory is recommended.

Pegasus Imaging Corp. (see listing for ColorView, above).

PICPress 1.2, \$495

Fractal-compression software that converts 24-bit Targa images to FIF 2.1 files. Lets you create a list of files for high-volume, overnight file compression. Requires 386SX processor or greater and at least 3MB of extended memory.

Pegasus Imaging Corp. (see listing for ColorView, above).

Pizazz Plus 4.0, \$149

Offers screen capturing and file conversion in a memory-resident program. Captures images in as many as 16 million colors or 256 shades of gray. Can adjust size, proportion, rotation, or placement of an image on the page. Provides direct file support for most major desktop-publishing applications. Translates files among many different graphics formats. Supports more than 400 printer models and image-capture boards, including AT&T Targa and ICB, ATronics, and Vision Technologies.

Application Techniques Inc., 10 Lomar Park Dr., Suite 2, Pepperell, MA 01463; 508-433-5201.

Search Programs

As your hard disk fills up, it becomes increasingly difficult to keep track of which files are where. Over time, things will only get worse: With mass storage costing a dollar or less per megabyte, the prospect of desktop systems with gigabytes of hard disk space is very real. With so much information on hand, how will you ever find the file you want? One way is with a file-search utility.

For years, users have enjoyed the search features of relatively simple applications, such as the shareware program WHEREIS.COM, which finds a specified filename or wildcard group within a subdirectory or anywhere on your hard disk. But many of today's search programs do much more: They can scan files in almost any format in quest of specific text, they can group files into a manageable list, and they can display the results of their efforts on screen.

Aeris 2.1, \$199.95

This file manager and viewer is built to handle diverse tasks. Use it to search for filenames or to locate information within the files on particular disks or in certain directories. The program supports a number of search parameters—including date, time, and size ranges—and lets you extract data for further processing, display, or printing. Use Aeris to translate data among a variety of popular file formats. Converts ASCII to EBCDIC and

vice versa; can also scan a database extract for specific data and then create a comma-delimited file from the information. According to the developer, there is no limit on file or record size. Aeri's high-level language lets you automate diverse file-processing tasks; tools include multikey sort and merge, cut and paste, replace, and print capabilities. New menu-driven features in the latest version let you use a mouse to select data from your print file, then choose field and record delimiters from a pick list; import the resulting file directly into a database or spreadsheet. (Windows compatible.)

BlueRithm Software, 21823 N. Glen Dr., Colbert, WA 99005; 509-468-1434.

Extend-a-File Plus 4.2, \$169.95

A file-search and -viewing utility that maintains as many as 50 current document profiles on a networked or stand-alone PC. Documents may be categorized according to descriptions and profiles that make sense to different sets of users. Assigns each profile group to a local drive for document storage and retrieval, reducing the complexities of document management. Places documents in the proper file and directory automatically, based on information you enter into a tabular profile. Also archives, renames, deletes, moves, and copies documents. Searches for files by word, phrase, and proximity. When working in the file viewer, you may cut text from any ASCII file or Lotus 1-2-3-compatible spreadsheet and paste it into WordPerfect documents.

World Software Corp., 124 Prospect St., Ridgewood, NJ 07450; 800-962-6360 or 201-444-3228.

Luke 1.01, \$169 plus \$16 shipping

A language-independent productivity tool for programmers. This "hyper-browser" lets you follow hyper-text links through your source and documentation files during program development. Lets you view as many as 16 search strings simultaneously in up to 2,000 files. Includes file and disk managers and facilities for integrating external editors, viewers, compilers, make utilities, and archivers.

Polyhedron Software Ltd., Linden House, 93 High St., Standlake, Witney OX8 7RH, United Kingdom; U.S. fax number, 800-777-5519.

Power!Search 1.1, \$99.95

This memory-resident program for finding and retrieving text searches all available hard disks—even those on a network—for any text string. Lets you use wildcard searches to find text when you know only a portion of the entry. Lets you construct conditional and "fuzzy" search specifications to find a broad range of text. Uses a proximity search to find multiple words within a specified number of words of each other. Also copies text from the document you're searching and pastes it into the document with which you're working.

Horizon Technology Inc., 3990 Ruffin Road, San Diego, CA 92123; 800-828-3808 or 619-292-8320.

Target 1.12, \$20 single-user home version

A file finder and manipulator, Target lets you select files on a local machine or across a network, then initiate

actions on those files, such as virus scanning, copying, renaming, regrouping, deleting, and archiving. Lets you use search parameters, such as date ranges, file sizes, attributes, file extensions, or duplicate files, and apply a variety of search masks. (Price includes two years of updates. One to 10 machines, \$175; other site licenses available.)

McAfee Associates, 2710 Walsh Ave., Suite 200, Santa Clara, CA 95051; 408-988-3832.

Utilities II, \$9.95

This file locator finds files by name and extension, size, date, time, and directory path. Lets you use wildcards to find a set of files. After locating files, the program can display them by date, pathname, or size. A tree display lets you search for subdirectories by mapping each subdirectory graphically in alphabetical order.

Personally Developed Software Inc., P.O. Box 3280, Wallingford, CT 06494; 800-426-7279 or 203-237-4504.

ZyINDEX for DOS 4.0, \$395

Primarily a text-retrieval program, ZyINDEX now also supports dBase III and IV and Lotus 1-2-3. Search requests may contain as many as 300 characters, including wildcards and Boolean logic operators. A thesaurus lets you search for synonyms.

Also performs proximity searches and conceptual searches, in which you group key words into concepts. File and index sizes are unlimited. Automatically senses word processing formats. (Network version for three users, \$995.)

ZyLAB, 100 Lexington Dr., Buffalo Grove, IL 60089; 800-544-6339 or 708-459-8000.

MEMORY MANAGERS

If you've been around PCs for more than a few years, you remember when a 64K machine was considered a high-end computer. Then came 512K machines, and, well, you know the rest of the story.

Today's midrange PCs generally have at least 8MB of memory, and many users need still more. But needing more memory isn't the real problem, because prices are amazingly low. The problem is helping your applications make efficient use of the memory you have. That's the job of memory managers.

DOS 6.0 and later include memory management power in the form of HIMEM.SYS, EMM386.EXE, and MEMMAKER.EXE. The key to using these utilities is careful configuration and installation. Most memory managers include a number of switches that change the way they operate, including which memory segments are made available. MemMaker's big advantage is that it tests multiple configurations and uses the results to choose the right switches for you.

The features built into DOS are all many users need, but if you want more flexibility, a third-party program may

be the solution. Quarterdeck's QEMM is the undisputed "old timer" in this market. Although it is promoted as an expanded memory manager (QEMM stands for *Quarterdeck Expanded Memory Manager*), it handles much more than that. Compatible with all current memory standards, QEMM lets you load memory-resident programs, device drivers, and other DOS resources into any available RAM.

Qualitas Inc.'s 386MAX provides a different set of memory-management features. In addition to upper-memory functions, this package gives you disk caching and system analysis.

If you need more power than DOS's utilities can provide, base your choice on which set of features you need. If you use a 286-based computer, for example, DOS's EMM386.EXE won't help you use high memory. For that, you need a third-party product, such as Quarterdeck's QRAM.

386MAX 7.0, \$99.95 BlueMAX 7.0, \$124.95

Pronounced "386-to-the-Max," this manager for expanded (EMS), extended (XMS), VCPI (virtual-control program interface), and DPMI (DOS protected-mode interface) memory offers system analysis as well. Its graphical interface makes it easy to recover most high DOS memory, including the unused portions of the area holding the system BIOS. Also includes a disk cache and VGA swap utility, which switches video drivers and the like into high memory, freeing up conventional RAM. In addition, lets you install VGA swap and disk cache as part of the program. Newest version supports disk compression and multiple boot configurations; also provides advanced memory checking designed to catch even intermittent failures. (Network and Windows compatible.)

BlueMAX handles memory management the same way, but is designed for the IBM PS/2 environment. Uses BIOS compression to free up more than 80K of contiguous high DOS memory. (Network compatible.)

Qualitas Inc., 7101 Wisconsin Ave., #1386, Bethesda, MD 20814; 800-733-1377 or 301-907-6700.

ATLast! 9.0b, \$79.95

An upper-memory optimizer that detects an expanded or upper-memory manager automatically, using it to convert all upper memory for use by DOS. Lets you automatically load above the 640K mark any DOS tables, networks, device drivers, memory-resident programs, and utilities—even COMMAND.COM and ATLast! itself. Continuously optimizes upper memory use, even as new devices are loaded. In 286- and 386-based machines, uses memory above 1MB to hold network shells. Compatible with all commercially available software for disk caching, CD-ROMs, and disk compression. Includes comprehensive memory-analysis utilities. Newest version supports multiple boot configurations and offers automated, unattended network installation. (Windows compatible.)

RYBS Electronics Inc., P.O. Box 4521, Boulder, CO 80306; 303-444-6073 (orders).

Boot Commander 1.2, \$59.95

A menu-driven boot-configuration utility, Boot Commander lets you maintain as many as 100 boot configurations and select one of them without modifying your CONFIG.SYS and AUTOEXEC.BAT files. You may choose which configuration to boot with a single key-stroke or let Boot Commander select your last configuration automatically. Lets you resolve conflicts among memory-resident programs and view CONFIG.SYS and AUTOEXEC.BAT files before bootup.

V Communications Inc., 4320 Stevens Creek Blvd., #275, San Jose, CA 95129; 800-648-8266 or 408-296-4224.

Dynamic Memory Control 3.5, \$79.95

This memory manager can load drivers and memory-resident programs into upper memory, then remove them automatically without your having to reboot the machine or change memory configurations. Compatible with a variety of other memory-management software, including DOS's EMM386.EXE, Quarterdeck's QEMM, and Qualitas's 386MAX. Also helps XT- and AT-class machines manage conventional memory.

Adlersparre & Associates, P.O. Box 403, Chesterfield, MA 01012-0403; 800-795-9896 or 413-296-0252.

Manifest 2.0, \$59.95

Offers memory-analysis and -monitoring capability. Determines how existing memory is being used by DOS, applications, and devices. Lets you improve memory allocation by browsing through the current configuration and following hints the program offers. Features pull-down menus for viewing the current configuration, as well as the contents of your CONFIG.SYS and AUTOEXEC.BAT files. Offered separately and as part of the company's DESQView package (see the entry under "Task Swappers and Multitasking Environments").

Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405; 800-354-3222 or 310-392-9851.

Memory Commander 4.0, \$99.95

Memory Commander, an automatic memory configuration manager, recovers "lost" memory beyond the 640K limit and adds it to conventional memory. Loads device drivers and memory-resident programs automatically into high memory, then adds unused high RAM to conventional RAM, opening up as much as 800K for use as conventional memory. Supports disk compression. Newest version includes on-line help and index.

V Communications Inc. (see listing for Boot Commander, above).

Memory Management Kit 2.02, \$45

A collection of three memory-management utilities. The VRAM module lets you create as much as 32MB of expanded memory by using disk space or extended memory to simulate expanded memory. Supports all

functions of EMS 4.0 and is network compatible. HRAM lets you access DOS's high memory area (HMA), even on 8088 and 80286 PCs. Automatically adjusts the order and placement of drivers and memory-resident programs. The MIN-MEM module lets you load memory-resident programs into expanded or extended memory or swap them to disk. Lets you create pop-up access to as many as 24 programs, including Borland International's Sidekick and Central Point's PC Tools.

Biologic Co., 7950 Blue Gray Circle, Manassas, VA 22110; 800-736-8088 or 703-368-2949.

Memory Miser 386 1.01, \$49.95

A 386 memory manager that frees upper-memory areas that otherwise would not be used for applications programs. Lets you load memory-resident programs and device drivers into upper-memory blocks to free space in lower memory.

SoftLogic Solutions Inc., 1 Perimeter Road, Manchester, NH 03103; 800-272-9900 or 603-627-9900.

NetRoom 3.03, \$99

Manages memory, providing as much as 800K of additional space. Works with 8088 and later machines to access upper, expanded, and extended memory; relocate drivers and programs to upper memory; load drivers without rebooting; and create a virtual machine with as much as 576K of RAM. Also lets you analyze memory and move ROM and BIOS code into RAM. Compatible with DOS 3.3 and later, as well as with Windows 3.x.

Helix Software Co. Inc., 47-09 30th St., Long Island City, NY 11101; 800-451-0551 or 718-392-3100.

QEMM 7.0, \$99.95

This expanded-memory manager lets you establish automatic or custom handling of all of your computer's memory, including conventional, expanded, extended, and high memory. You may optimize memory management by loading memory-resident programs and device drivers automatically into high memory and by accessing unused ROM BIOS memory (up to 115K). Supports a "suspend/resume" feature in some laptops and shadow memory from Chips & Technologies. Also gives Windows 3.x users up to 24K more RAM for DOS applications. Lets you browse and change the list of device drivers and memory-resident programs in high RAM.

Quarterdeck Office Systems (see listing for Manifest, above).

GRAM 2.0, \$79.95

A memory-resource allocator for 8088-class and AT-style 80286 computers with EMS 4.0 or EEMS (enhanced expanded memory specification) memory. Loads programs into high memory. Includes optimizing features that load TSRs and device drivers automatically into high memory.

Quarterdeck Office Systems (see listing for Manifest, above).

RAMager, \$69

This memory optimizer can help you make the most of your 386's and 486's memory. Maximizes available

memory space in DOS, as well as loading memory-resident programs and drivers automatically into upper RAM. Expands upper memory automatically when needed for memory-resident programs, then releases it when additional memory is no longer required. Shares memory dynamically between extended and expanded memory, eliminating the need to reconfigure and reboot to change the way memory is allocated.

Acculogic, 13715 Alton Parkway, Irvine, CA 92718; 800-234-7811 or 714-454-2441.

MULTIPURPOSE PROGRAMS

Most utilities are easy to classify because they handle a limited set of tasks. Multipurpose packages, on the other hand, perform numerous tasks—everything from presenting menus to recovering data, doing disk maintenance, searching files, compressing data, and providing security.

Symantec's Norton Utilities is a good example of this type of application. It performs data recovery (including undeletion), encryption, disk maintenance (including defragmentation), batch programming support, and a host of other chores. Team it up with The Norton Desktop, a user-friendly multipurpose shell, and you have one very powerful software combination.

Among the long-running favorites in this arena is Central Point Software's PC Tools Pro. Like The Norton Utilities, it offers a plethora of features, from data recovery and backup to virus protection, menu creation, caching, and communications.

Other strong players include Brown Bag Software's PowerMenu Plus, which bundles menu power, memory management, and usage tracking in one low-cost package; and System Enhancement Associates' SEA System Utilities, which provides a menu as well as a file-move utility.

For still a different combination of features, consider PC-Kwik's Power Pak. Its strengths lie in disk optimization, data caching, and multiconfiguration booting.

Menu Works Advanced 2.1, \$49.95

Contains all the features of MenuWorks Personal (see the entry under "DOS Shells"), plus password access with levels of security and customizable menus. Also provides software metering, project tracking, and audit trails. Script programming language supports customized menus and help. Disk-management features let you organize files and directories. Offers custom hot-key programming. Program recognizes and builds menus for more than 2,500 popular software packages. Works on networked or stand-alone systems. (Site-license prices start at 50 percent off.)

PC Dynamics Inc., 31332 Via Colinas, Suite 102, Westlake Village, CA 91362; 800-888-1741 or 818-889-1741.

MultiWorks 30 2.1 for MS-DOS, \$29.99

Comprises 30 applications and utilities, among them an address book, word processor, dBase III-compatible database, spreadsheet, spelling checker, and calendar maker. Handles files containing as much as 20MB of data. Database includes browse and edit modes, a memo editor, and logical replace, delete, count, and recall functions. Spreadsheet supports a maximum of 702 columns by 10,000 rows and includes 18 built-in formulas. Also includes graphing; copy, move, and delete-range features; and font and typeface control. The mailing-labels utility can print addresses on a label or envelope of virtually any size, singly or in batches. Also includes alarms, a calculator, data encryption, a DOS shell, an information manager, mail merge, a report generator, communications software, a time manager, and a to-do list.

The Wizardworks Group, 3850 Annapolis Lane N., Plymouth, MN 55447; 612-559-5140.

The Norton Desktop 1.0, \$179

Provides an automated menuing system for handling backups, visual file management, virus protection, and data recovery. These Windows-like menus let you access DOS facilities with drag-and-drop ease. File manager lets you view data files from more than 50 popular packages without launching the associated program. Compares directories and moves files among directories. Lets you use a mouse to select groups of files for backup, viewing, printing, deleting, compressing, or virus checking. Also lets you launch applications by selecting their associated files. Configures the menuing system automatically for applications already installed on your disk, then lets you access them with simple keystrokes or mouse movements. Detects and eliminates more than 1,000 known viruses and detects unknown virus activity. Lets you schedule unattended backups to tape, floppy disk, or another hard disk. Automatically detects and repairs common disk problems and recovers lost data.

Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

The Norton Utilities 8.0, \$179

A collection of data-recovery and disk-management modules. Enhances DOS with NDOS, a utility that reduces DOS's memory requirements; lets you add 40-character descriptions to filenames; supports a batch-programming language; and offers command-line history, editing, and audit trails. NDOS's pop-up, context-sensitive help steps you through complex DOS procedures. Adds erase protection and unerase features; its NCD program lets you change directories by name without entering the complete pathname. Disk Doctor module detects and solves common disk errors automatically, defragments your hard disk, and adjusts a drive's interleave setting. Lets you encrypt sensitive data in the background to maintain security (a password is required for future access) and lock your keyboard and screen to restrict access to the computer. Wipeinfo

removes all stored information in specified files, making it impossible for others to retrieve deleted files. Compatible with task switchers and multitasking environments; improves PC performance. Newest version supports disk compression; includes enhanced diagnostics for interrupt-conflict analysis and joystick testing; and features a suite of Windows-specific utilities, including troubleshooting and repair tools. (Upgrades to registered users, \$49. Network compatible; administrator add-on utilities available separately.)

Symantec Corp. (see listing immediately above).

PC-Kwik Power Pak 3.1, \$129.95

A multipurpose utility that includes a disk optimizer, disk cache, and other applications. Defragments disks containing as much as 1GB of data, tests disks for bad sectors, and sorts directories. Displays a disk's file structure so that you can find out how files are stored before defragmenting or reorganizing them. The included disk cache, PC-Kwik Power Disk, speeds up performance. Sets up a boot file that lets you create as many as 26 bootup configurations. Lets you save the screen buffer to a disk file and create keyboard aliases. Offers enhanced type-ahead buffers. Includes a print spooler and a screen accelerator to improve screen-update performance.

PC-Kwik Corp. (formerly Multisoft Corp.), 15100 S.W. Koll Parkway, Beaverton, OR 97006; 800-274-5945 or 503-644-5644.

PC Tools Pro 9.0, \$179.95

A multipurpose DOS utility package. Includes a hard disk backup program, data-recovery feature, defragmenter, and disk cache; Central Point AntiVirus; RAMBoost, an upper-memory optimizer; the DriveMap remote-device mapper; and an integrated task switcher. Includes the PC Tools Desktop's advanced menuing system as well as customizable menus and function keys and a ZIP-compatible file-compression module. FileFix utility repairs corrupted files created by Paradox, R:Base, dBase, Quattro Pro, Excel, Lotus 1-2-3, Symphony, WordPerfect, and more. A security module includes password protection for files, directory encryption, a disk wiper, and a safe-disk formatter. A program scheduler allows automated backup, compression, disk optimization, and virus detection. Newest version of the program includes CPR (a data-recovery module) and supports PKZIP file compression.

Central Point Software, 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, OR 97006; 800-445-4208 or 503-690-8090.

PowerMenu Plus 7.0, \$49.95

This disk organizer, disk manager, system manager, and security program lets you copy, move, erase, rename, hide, protect, and compress files and directories from within a Windows-like menuing system. Finds and launches programs, groups applications by type or directory, and lets you set up multiple accounts to give each user custom menus and file sets. Also lets you design user-specific help screens and establish group menus, allowing several users to share the same menu setup while maintaining a customized set of options and security levels. Tracks user and program activity and displays available memory, printer status, and a map of memory-resident programs. Supports up

to 10,000 different menu options from as many as 26 drives. Newest version includes menu-driven text-string search through word processing, archived, compressed, executable, and command files; timed execution of programs or menu items, once or according to a pre-specified schedule; and macro features that let you record keystrokes to automate routine tasks.

Brown Bag Software Inc., 2155 S. Bascom Ave., Suite 105, Campbell, CA 95008; 800-523-0764 or 408-559-4545.

The Q-DOS Collection 1.0, \$179

Primarily a bundle of Gazelle Systems' other separately priced utilities, The Q-DOS Collection contains Back-It 4, OPTune, and Q-DOS 3 (see listings under "Backup Programs," "Disk Optimizers," and "DOS Shells," respectively). Added to the mix are a disk-caching utility; an antivirus program from Trend Micro Devices; Q-Menu, a menu-based interface that lets you control the utilities in the collection as well as your own applications; a data-recovery tool; V Communications' Memory Commander, for monitoring and reassigning memory; and a junior version of AddStor's SuperStor disk compressor.

Gazelle Systems Inc., 305 North 500 W., Provo, UT 84601; 800-786-3278 or 801-377-1288.

The SEA Disk Utilities 1.6, \$35

These six programs let you display available disk space graphically, scan a disk for bad sectors, squeeze a directory (removing deleted files), or undelete files you have erased accidentally. The WipeFree utility overwrites all unused clusters on the specified drive; the OhMyGawd program converts all unused clusters on a disk into files, making all information on the disk available for inspection or retrieval. (Version including The SEA System Utilities, \$65.)

System Enhancement Associates Inc., P.O. Box 949, Nassawadox, VA 23413; 804-442-5865.

The SEA System Utilities 2.9, \$35

A package of 15 programs for managing your PC and its files. ARF lets you "preanswer" the computer's "Abort Retry Fail" question so that the machine can run unattended. ASCII, which scans the specified file for printable characters, is useful for searching program files for notes, errors, or hints; CHMOD examines and changes file attributes.

Other bundled programs let you respond automatically to keyboard-input requests from other applications, build a single-key macro, provide a DOS command menu, move files among directories in one step, and monitor system performance, among other functions. (Version including The SEA Disk Utilities, \$65.)

System Enhancement Associates Inc. (see listing immediately above).

Utilities Package, \$29.95

A package consisting of PDS's Utilities I (file compressor), Utilities II (file locator), and Utilities III (file maintenance program). Individual write-ups on these components are located in the "Archivers and Compressors," "Search Programs," and "File-Transfer Programs" sections, respectively.

Personally Developed Software Inc., P.O. Box 3280, Wallingford, CT 06494; 800-426-7279 or 203-237-4504.

PRINT SPOOLERS

Printing slows down your computer. Data must be formatted and sent to the printer in the proper sequence and, until the print job is finished, most software can't do anything else. If the file you're printing is long, the application you're working in may be tied up for several minutes or even hours.

Print spoolers reduce the wait. They sit in memory and grab information targeted for the printer; instead of sending the file to the printer and forcing the program to wait for each page to be printed, data is sent to a memory or disk buffer. The memory-resident spooler stands in for the application, sending data to the printer as soon as the printer can accept it. The spooler operates in the background, so that you can get back to work.

Many print spoolers also let you view the print queue, display documents in the queue on screen, rearrange the order of printing, reprint selected documents, and generate multiple copies of a document. Some products use RAM only; others use a combination of RAM and disk space. All things being equal, a printer buffer stored in memory operates faster than one that uses disk storage as well. If you have a limited amount of conventional memory, however, you should find out whether the spooler you're considering uses extended or expanded memory. This frees up conventional memory and increases the amount of data it can buffer. LaserTool's Print-Cache, for example, uses all types of memory in addition to hard-disk space, which gives you a virtually unlimited amount of quick-access buffer space.

DressUp Pro 1.0, \$39.95

DressUp Pro speeds up printing by reducing the page count of a document. Prints from two to 32 pages on one piece of paper, placing as many as 4,000 lines of legible text on a single page and adding overlaid messages, borders, shading bars, time/date stamps, page numbers, and other effects. Prints booklets in six formats, including pocket size. Prints multiple copies or selected pages of a file, and produces (in two passes) double-sided Hewlett-Packard LaserJet output. Lets you "tile" pages onto laser forms, creating sheets of postcards, labels, business cards, and the like. In portrait mode, can print on one letter-size sheet files whose lines contain as many as 266 characters. In landscape mode, fits as many as 353 characters per line. (Requires an HP LaserJet or compatible printer.)

Discoversoft Inc., 1516 Oak St., Alameda, CA 94501; 510-769-2902.

GoScript 5.5, \$149 GoScript Plus 5.5, \$299

A suite of printing utilities designed to provide PostScript support for non-PostScript printers. Lets you specify a PostScript printer within your application, then print the file to dot-matrix and other non-PostScript devices. No extra hardware needed. Lets you access PostScript archival documents on EGA, VGA, super-VGA, or Hercules monitors.

The program's PortaView utility creates a portable, self-displaying view file of your PostScript document (with optional password encryption). Converts files to bit-mapped formats. Converts PostScript to TIFF, PCX, DCX, and PCL, printing at resolutions of 45 to 1,000 dots per inch and in sizes ranging from 1 inch to 30 inches. Lets you print from DOS and Windows 3.1 applications; includes international characters. Compatible with Type 1 and Type 3 PostScript fonts and with TrueType fonts. GoScript includes support for 13 fonts; GoScript Plus offers 35 fonts.

LaserGo Inc., 9369 Carroll Park Dr., Suite A, San Diego, CA 92121; 619-450-4600.

GS32 5.5, \$199 GS32 Pro 5.5, \$299

A version of GoScript (see above) for the 32-bit environment. Runs in 386/486 protected mode, about twice as fast as GoScript Plus. Can access all your system's extended memory and hard disk virtual memory (as much as 3.5 gigabytes). Includes the 35 most popular PostScript typefaces and supports most popular printers. Converts PostScript to TIFF, PCX, and DCX. GS32 Pro includes all the features of GS32, plus color support for the HP DeskJet 1200C, 500C, and 550C; Canon Color BubbleJet 600, 800, and 820; CalComp 68000 series; and Star Micronics SJ-144. PortaView utility generates stand-alone PostScript view files.

LaserGo Inc. (see listing immediately above).

GS Color, \$99 GS Color Pro, \$199

Prints color PostScript files on popular color printers. Lets you add PostScript text and graphics to your color pages. Supports HP DeskJet 550C, 500C, and 1200C; Canon Color BubbleJet 600, 800, and 820; and CalComp 68000 series. Converts PostScript to 8-bit color PCX and TIFF. Includes the 35 most popular PostScript typefaces.

GS Color Pro includes all the features of GS Color, plus 32-bit operation, requiring a 386- or 486-based PC. Supports HP DeskJet 1200C, HP DesignJet 650C, and Star Micronics SJ-144. Also handles 3-, 8-, 24-bit color TIFF and PCX files.

LaserGo Inc. (see listing for GoScript, above).

PrintCache 3.1, \$99.95

A memory-resident print spooler with pop-up dialog-box control, PrintCache can buffer print files in conventional, extended, or expanded memory, or store them on a hard disk. It lets you specify how much data to spool to disk or RAM and frees up the keyboard fast, even on big print jobs.

Requires 6K to 17K of RAM and supports all serial and parallel printers and plotters. Works for DOS and

Windows applications. The company claims the program is 20 to 40 percent faster than the Windows 3.1 Print Manager. Newest version runs as a full-fledged Windows program while retaining all DOS features and functionality.

LaserTools Corp., 1250 45th St., #100, Emeryville, CA 94608; 800-767-8004 or 510-420-8777.

PrintQ 6, \$99

The PrintQ 6 print spooler includes 11 utilities and can control as many as eight printers. Lets you reprint individual pages or groups of pages without restarting the source application. Also lets you print to a file, print ASCII files to PostScript printers, and view output without printing. Compresses application output to a disk file and holds it for later printing (useful with laptop machines when no printer is available). Loads into the highest memory available and handles a maximum of 19K of files.

Software Directions, 1572 Sussex Turnpike, Randolph, NJ 07869; 800-346-7638 or 201-584-8466.

SpoolMaster 5.6, \$69.95

SpoolMaster lets you buffer print files in RAM and direct output to one of two printers or to a disk file. The spooler's status screen tells you the number of pages and bytes left to print and how long it will take to print them. In combination with the company's Flash disk-caching software (see the entry under "Disk-Caching Programs" in the "Disk Utilities" section), can use extended and expanded memory. (\$49.95 when purchased with Flash.)

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

TonerSaver 4.0, \$29.95

This "print filter" intercepts print data and adds commands that save toner when printing in one of three user-specified densities. According to Discoversoft, TonerSaver saves you a penny per page whenever you print draft copies.

Also prints pages with custom overlaid messages, and adds boxes, lines, shading bars, and time/date stamps. You may turn TonerSaver off at any time. Uses 5K to 19K of RAM; 1.7K with EMS. Handles graphics, soft fonts, and macros.

Discoversoft Inc. (see listing for DressUp Pro, above).

TreeSaver 4.1, \$49.95

Prints from two to 16 "virtual pages" per side of paper. Makes saddle-bound books and pamphlets, shrinks full-size pages to fit personal organizers, and produces double-sided printouts on any laser printer. Uses as little as 25K of DOS RAM; 1.5K with EMS memory. Handles images, soft fonts, and LaserJet macros; offers programmable hot keys. Prints on letter, legal, A4, executive, and smaller sheets. Comes with several soft fonts and a print-capture utility. Handles European characters. Requires an HP LaserJet or compatible printer; extra printer memory not required.

Discoversoft Inc. (see listing for DressUp Pro, above).

SCREEN UTILITIES

If you think you have to take your screen display as it is, think again. The many screen utilities on the market perform tasks as varied as altering the way the cursor works, preventing unsightly screen burn-in, preventing snoops from rummaging through your hard disk files while you're away from your computer, and improving the quality of the screen display.

Cursor-Control Programs

One of the most prominent features of your DOS display is the cursor. DOS controls how the cursor looks and how fast it moves. If you're the technical type, you can use ANSI.SYS commands to change its appearance and behavior.

If you'd rather let someone else deal with the intricacies of ANSI.SYS, consider a cursor-control utility. AAPex Software's Big DOS Cursor, for instance, enlarges the cursor so that it's easier to see—particularly helpful if you spend lots of time peering at your laptop's LCD. If you're looking for more control, such as changing the keyboard's delay rate and eliminating cursor "run-on," a program such as Revolution Software's Cruise Control is a logical choice.

Big DOS Cursor 1.3, \$29.95

Enhances the size of the cursor and makes it stand out more clearly on a laptop screen. Requires less than 1K of memory. Compatible with WordPerfect, Lotus 1-2-3, and other software running in text mode. (Not compatible with Microsoft Word.)

AAPex Software, P.O. Box 13379, Reno, NV 89507; 800-728-7650 (orders) or 702-324-4580.

Cruise Control 3.025, \$59.95

A cursor-speed and run-on control utility, Cruise Control also includes the company's VGA Dimmer screen blanker for extending the life of your screen (see entry under "Screen Blankers," below). Adds a time/date stamp within any program and repeats a key without your typing it again.

Revolution Software Inc., 20 Chester Woods Dr., Chester, NJ 07930; 908-879-7038.

NoBlink 5.3, \$49.95

A 6K memory-resident program, NoBlink lets you change the cursor's appearance and speed from an accessible pop-up window. Offers choice of nonblinking cursors and cursors that blink under certain conditions, as well as an assortment of shapes. On color monitors, NoBlink lets you choose from 26 color combinations for foreground and background.

Instant Replay Corp., P.O. Box 1750, St. George, UT 84771; 800-388-8086 or 801-634-7648.

No-Squint II, \$49.95

A 5K memory-resident program, No-Squint lets you enlarge and change the blink rate of the cursor in most applications, including WordPerfect, Microsoft Works, and Q&A. (It does not work in Microsoft Word, however, or in certain graphics programs, such as Windows and Tandy's DeskMate.) Comes with automatic installation and on-screen help.

SkiSoft Publishing Corp., 1644 Massachusetts Ave., Suite 79, Lexington, MA 02173; 800-662-3622 or 617-863-1876.

Unblink 2.1, \$39

Unblink turns the standard DOS cursor into a solid, nonblinking cursor or a cursor that blinks slowly, making it easier to see—especially on laptops. Lets you switch between blinking and nonblinking cursors with a keystroke. Compatible with all display types.

Biologic Co., 7950 Blue Gray Circle, Manassas, VA 22110; 800-736-8088 or 703-368-2949.

Screen Blankers

Computer users seem to fall into two groups: those who run their machines only when they need them and those who leave their systems on for days at a time. If you're one of the former, you should consider a screen blanker. These utilities note the time of the last keystroke, mouse movement, or screen update, and, after a predetermined time of inactivity, turn off the display. This prevents a static image from "burning" into the screen, leaving a permanent impression.

Early screen blankers (or "screen savers") turned your screen black until you pressed a key. Today, these programs do much more. Some display moving images; others present a slide show of scanned or PhotoCD photographs. Multimedia screen blankers may include voice or music as part of the entertainment. And some products protect your files by demanding a password before restoring the normal display.

Popular among Macintosh users for some time, Berkeley System's After Dark is a classic of the genre. Its flying toasters, sound-card support, system-activity monitor, and "quick sleep" hot key are now available to DOS users. If you're looking to save money, however, you can get a better deal by purchasing a program that includes both screen blanking and other features you need. Some security products, for instance, include screen blankers, as do many shell and menu programs.

After Dark for DOS 1.0, \$49.99

This popular Mac and Windows screen saver is now available for DOS. Includes SoundBlaster- and AdLib-

compatible digitized sound and 30 separate displays, including the well-known flying toasters. Also outputs sound to the internal PC speaker.

Berkeley Systems Inc., 2095 Rose St., Berkeley, CA 94709; 510-540-5535.

PhantomScreen 1.2B, \$25

A memory-resident screen saver requiring only 7.9K of RAM while inactive. Includes a variety of screen effects, or you may use art stored in PCX format. Permits hot-key or timed operation. Optional password protection prevents unauthorized users from reactivating the display.

Neosoft Corp., 354 N.E. Greenwood Ave., Suite 108, Bend, OR 97701; 800-545-1392 or 503-389-5489.

ScreenSaver VGA 1.0, \$19.99

A menu-driven screen-saver utility that blanks the screen and replaces your application's display with a moving image after a preset period of inactivity. Lets you use predefined or custom displays, including public domain or shareware utilities. Offers 13 displays, ranging from a blank screen to spinning colors.

The Wizardworks Group, 3850 Annapolis Lane N., Plymouth, MN 55447; 612-559-5140.

VGA Dimmer 3.0, \$35.95

An automatic screen-blanking utility that protects VGA, EGA, MCGA, CGA, MDA, AT&T 6300, and Hercules-compatible screens from burn-in. Offers automatic or manual activation. Uses approximately 5K of RAM.

Revolution Software Inc., 20 Chester Woods Dr., Chester, NJ 07930; 908-879-7038.

Screen Optimizers

If you're like most users, you spend most of your computing time looking at a screen with 80 columns and 25 lines, even though your super-VGA card and monitor can display 132 columns and 60 lines. A screen optimizer lets you peek at higher resolutions and packs more text on screen. A number of screen optimizers also make it their business to improve the resolution of graphics-intensive displays, simultaneously boosting the speed at which images are displayed. Personics' Laptop Ultra-Vision is one such program. The company claims it speeds up the display by 300 percent.

MAGic from Microsystems Software has a different goal. Instead of shrinking the information displayed, MAGic enlarges it by as much as 200 percent, making it easier to read.

One of the most interesting collections of screen utilities is the HandiWare series, software that helps users with visual or manual handicaps get more out of their computers. These utilities let you enlarge the screen dis-

play, display a beep visually, and "speak" a display.

To speed up the screen and save data that has scrolled off the display, consider Software Matters' Total Recall. It sets up a data buffer to hold information that has scrolled out of sight. When you need to see data that has disappeared, you may page through the buffer.

Desktop UltraVision 2.12, \$99.95

Desktop UltraVision, a screen enhancer for VGA or EGA displays, improves the resolution of most applications, changing VGA's standard 9- by 16-pixel character cell (or "pel," the smallest picture element displayed on a video monitor) to a sharper, smoother 9- by 19-pixel cell. Works with many popular applications, letting you choose one of 10 fonts and see more on screen. Also lets you redefine screen colors and fonts used by most text and graphics applications. Includes a display accelerator that can increase the speed of screen writes by 200 to 300 percent.

Personics Corp., 234 Ballardvale St., Wilmington, MA 01887; 800-445-3311 or 508-658-0040.

HandiWare

The HandiWare umbrella encompasses eight specialized programs for users with disabilities. HandiWORD 3.0 (\$295) and HandiSHIFT 2.13 (\$49) are for people with slow or physically limited typing skills. SeeBEEP 2.0 (\$20) visually displays a computer beep on screen, and HandiKEY 3.0 (\$395) lets you enter keystrokes by using a device such as a mouse or trackball to select a key or function from an on-screen display. HandiKEY Deluxe 3.0 (\$495) includes speech-output capabilities for use with a voice synthesizer. HandiCHAT Deluxe 2.23 (\$295) offers a speech-window scratch pad and a special window with access to 1,300 phrases or series of phrases for nonspeaking users. HandiPHONE 2.01 (\$595) is a computer-controlled speaker-phone system that provides hands-free telephone access. HandiCODE 2.10 (\$395) accepts Morse code input.

Microsystems Software Inc., 600 Worcester Road, Framingham, MA 01701; 800-828-2600 (orders) or 508-879-9000.

inFocus 1.03, \$149

ZoomText 4.40, \$495

ZoomText Plus 1.40, \$595

A trio of memory-resident screen magnifiers. inFocus magnifies an entire screen, a single line, or a scalable window. ZoomText provides customizable magnification levels, foreground and background color selection, smooth-edged fonts, and other screen utilities. ZoomText Plus adds magnification of DOS-based graphics, as well as Windows utilities.

Ai Squared, P.O. Box 669, Manchester Center, VT 05255; 802-362-3612.

Laptop UltraVision 2.1, \$99.95

A screen enhancer for LCDs and other flat-screen displays of the type frequently found in portable computers. Works with many popular programs, adding extra lines of text: 25, 34, 50, or 60 compressed lines on

VGA screens and 25 or 43 compressed lines on EGA screens. Lets you choose from more than 20 fonts and gray scales. Also lets you keep the same number of lines and characters on screen while expanding the image to the top and sides of the screen. Includes a display accelerator that can increase the speed of screen writes by as much as 300 percent. Requires an EGA or VGA flat-panel screen; occupies 9K of RAM for EGA portables and 16K of RAM for VGA units.

Personics Corp. (see listing for Desktop UltraVision, above).

MAGic 1.33, \$79

MAGic Deluxe 1.33, \$295

A screen-magnification program, MAGic enlarges the type in spreadsheets, databases, word processors, and the like. Works on color and monochrome video displays and laptop screens. Lets you magnify text by 20, 40, and 200 percent and enlarge graphics by 200 percent. MAGic Deluxe adds 400, 600, and 1,200 percent "smooth font" magnification, a screen locator, bookmarks for returning quickly to a particular spot in a document, and an autopan feature that lets you move information in eight directions. Stacked mode lets you wrap text that is too long to fit on a single line.

Microsystems Software Inc. (see listing for HandiWare, above).

Total Recall, \$69.95

This screen accelerator improves system performance by speeding up screen updates. Lets you save for future review information that has scrolled off screen. Performs repetitive DOS commands at the touch of a key, creates 43- and 50-line screens, and searches for information stored in the screen buffer. Lets you choose previously issued DOS commands from a pop-up window that displays the last command issued.

Software Matters Inc., 6352 N. Guilford Ave., Indianapolis, IN 46220; 800-253-5274 or 317-253-8088.

SECURITY PROGRAMS

If you deal with sensitive data or work in an environment where unauthorized personnel are likely to take an interest in your files, consider a bit of protection. Security software offers a variety of features:

- **Password protection** lets you restrict who can boot the system, read a file, save a file, or start an application. Many programs also let you control who can do what at the system, disk, directory, application, and file levels.

- **Data encryption** scrambles information as it is written to disk. To retrieve encrypted data in a meaningful form, you need the decryption code and perhaps a password.

- **Boot protection** prevents unauthorized users from starting up your system with a floppy disk and thus gaining access to your hard drive.

- **Screen blanking and keyboard locking** prevent prying. Many screen blankers provide for a password that will turn the screen back on after it is blanked. Some also lock the keyboard until a second password is entered.

The security products mentioned here usually include more than one of these protection methods. Some offer additional features, as well, not only preventing unauthorized entry but also protecting anyone from mistakenly deleting or changing a file. Other security programs let certain users access programs and data, but prevent them from copying anything to a floppy disk. Stop-Copy Starter Kit from BBI Computer Systems is one such utility.

Other utilities help you plan and maintain an adequate security system. Online Auditing Using Microcomputers from Jerry FitzGerald & Associates, for example, offers a collection of public-domain utilities accompanied by a manual that helps you audit your system and design appropriate security.

Access II 1.6, \$165

Access II Plus, \$195

This multilevel PC security utility establishes as many as 16 security levels, each with a unique set of resource permissions. Lets you deny certain users access to all resources, including files, directories, DOS, system devices, and printers. Provides scaled access to users with higher security classifications. Incorporates Kinetic Access Menu, which restricts users from booting up with a floppy disk and offers a privacy key that lets you blank the screen manually. To restore the display, you must provide a password.

Access II Plus also includes an expansion card that makes it impossible to boot from drive A.

Kinetic Corp., 240 Distillery Commons, Louisville, KY 40206; 502-583-1679.

ACCESS Guard 2.5, \$79

An access-control utility based around password protection, ACCESS Guard locks out attempts to boot from a floppy disk and requires a password before the computer will boot from the hard disk. Includes screen blanking and mouse and keyboard locking. Creates a detailed audit trail of all attempts to access the protected machine.

Information Security Services Inc. (formerly Commcrypt), 12211 Distribution Way, Beltsville, MD 20705; 800-334-8338 or 301-470-2500.

AT&T SecretAgent 3.0, \$329.95

Developed by Information Security Corp. of Deerfield, Illinois (manufacturer of Digital Signature Algorithm, below), SecretAgent's data-encryption system is designed to protect data stored on a PC and to safeguard information sent via a network or communications channel. Uses DES, as well as Digital Signature Algorithm (DSA) and Secure Hash Algorithm (SHA), for

hard disk files and transmitted information. You may choose a user-friendly menu interface or a Unix-like command-line interface. Uses a macro script in Word-Perfect, Procomm Plus, Crosstalk Mark 4, and other applications. Uses public keys with private passwords so that anyone with access to the public key can encrypt messages readable only by users with the correct private password. (Newest version adds RSA encryption. Windows version, \$329.95; site licenses available.)

AT&T Secure Communications Systems, P.O. Box 20046, Greensboro, NC 27420, Attn: D10020100; 800-203-5563.

Authorized Personnel Only, \$29.95

APO's security measures are based around password protection. You must type the correct password entry before a protected computer will boot. Lets you assign multiple passwords, including as many as eight guest passwords, and define the number of password attempts before an alarm sounds. Clears itself from memory after you log on successfully.

CMG Computer Products Inc., P.O. Box 160310, Austin, TX 78716; 800-880-9980 or 512-263-9691.

CA-Top Secret/PC, \$310

A security utility for PCs connected to an IBM MVS mainframe, this program enforces enterprise-wide security policies, in addition to providing password-protected access control and file encryption. Lets PC users access mainframe data without compromising the integrity of the downloaded data or the system at large. Controls and manages network security—including PCs—from the mainframe. Lets you install and maintain PC software from the mainframe.

Computer Associates International Inc., 1 Computer Associates Plaza, Islandia, NY 11788; 516-342-5224.

ComLock

The ComLock family of access-control utilities lets you design your own security system by mixing and matching components. ComLock-B 8.55 (\$59) prevents unauthorized access to a computer and its data. It accommodates a maximum of eight users and permits passwords of 10 or fewer characters. Prevents unauthorized users from booting from a floppy disk. Blanks the screen after a set time and requires an additional password to reactivate the system.

ComLock-D 8.55 (\$79) adds access control for sub-directories and multiuser systems. Lets you switch users without rebooting. ComLock-DG (\$169) includes ComLock-D's features and adds the ability to define a closed group of computers to prevent data interchange with machines outside the group.

Techmar Computer Products Inc., 98-11 Queens Blvd., #2C, Rego Park, NY 11374; 800-922-0015 or 718-997-6666.

Crypto/Cram 0.5, \$30

Compresses and encrypts several files at once. Supports wildcard specifications and user-defined encryption or compression activity log files. Lets you select files according to their date and time stamps. Includes separate Xtract utility for decryption and decompression.

(Distribution kit, which lets you circulate encrypted applications, \$149.)

Radix2 Software Engineering, P.O. Box 621, Libertyville, IL 60048; 800-946-8086 or 708-549-6733.

CRYPTOLock 4.2, \$99

This menu-driven data-encryption and password-protection utility creates multiple "safes" for storing encrypted data. Safes are protected with passwords. Lets several users share a computer while retaining exclusive access to individual data. Maintains an audit trail of all program actions and encrypts all E-mail messages before transmission. Encrypted data is compressed automatically, providing additional storage space. Includes antivirus protection.

Information Security Services Inc. (formerly Commcrypt; see listing for ACCESS Guard, above).

Data Security Plus 5.5, \$99.95

Teams access control and data protection with virus detection and removal. The software's six modules use passwords to restrict access to a PC, blank the screen, lock the keyboard, and prevent execution of unauthorized programs.

Also protects against boot-sector and program viruses, removes detected viruses, or halts the system automatically when a virus is detected. Restricts access to specified directories, creates audit trails showing program and file use, as well as user activity. Forces regular backups of data using the program's included utilities. Also offers DES data encryption.

PC Guardian, 1133 E. Franciscan Blvd., Suite D, San Rafael, CA 94901; 800-288-8126 or 415-459-0190.

Digital Signature Algorithm, \$149.95

Known formerly as dsasIGN, this file-authentication and security utility provides irrefutable assurance that the documents you exchange with another correspondent have not been modified and that they come from the purported sender. Certifies and exchanges public keys, then uses an individual's private key to attach a digital signature to a document. Complies with the August 1991 Digital Signature Standard (DSS) published by the National Institute of Standards and Technology (NIST), using DSA and SHA.

Information Security Corp. (a subsidiary of Information Conversion Services Inc.), 1141 Lake Cook Road, Suite D, Deerfield, IL 60015; 708-405-0500.

DiskLock 2.0.2, \$79

DiskLock locks your hard drive each time you boot the system, then uses multiple password levels to control access. Encrypts selected files, providing additional protection against unauthorized viewing or access. Once installed, it operates automatically; the program also features an option to load DiskLock into high memory. Newest version includes virus protection and on-line auditing, plus enhanced password aging and tighter control over password reuse. (Supports network drives; features support for up to five users, guest users, and a master administrator.)

Fifth Generation Systems/Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

Dolphin Encrypt 3.10, \$95 Dolphin Encrypt Advanced Version 3.0, \$175

Dolphin Encryption Library 2.30, \$175

Dolphin Encrypt is a proprietary data-encryption and -decryption utility that accepts encryption keys from eight to 60 characters in length. It can protect individual files, one or more directories, or an entire disk. Provides a script language to automate frequently performed, complex, or conditional operations. Lets you view or purge files. (Files are compressed during encryption.) The encryption algorithm relies partly on RSA Data Security Inc.'s MD5 Message Digest Algorithm. (Windows version included. Decryption module only, \$10.)

The Advanced version lets you display a decrypted file on screen only, without writing to disk; in addition, you may encrypt files so that display-only mode is mandatory. You may also encrypt entire floppy disks. Six additional utilities (purging files, wiping disks clean, creating hidden subdirectories, and related operations) are included.

The Dolphin Encryption Library collects the key-processing and encryption/decryption functions used in the two Dolphin packages profiled above for inclusion in C programs. These routines let C programs encrypt and decrypt blocks of data in memory or in disk files. The package includes functions for converting binary data to and from text, plus demonstration and test programs. (Compatible with Borland and Microsoft C/C++ compilers; available in small-, medium-, and large-memory models.)

Dolphin Software, 48 Shattuck Square, #147, Berkeley, CA 94704; 510-464-3009.

Encryption Plus, \$49.95

Encryption Plus offers transparent encryption/decryption "on the fly" as information is transferred back and forth between hard drive and memory. After installation, your system prompts you for your password each time you boot the PC; the correct password grants you access to the information on the encrypted hard drive. You may copy or transmit encrypted data and load it into any PC sharing the same encryption key; other users with valid passwords may then access the data. Failing six times to enter the correct password locks up the encrypted hard drive (not the rest of the PC system).

PC Guardian (see listing for Data Security Plus, above).

FastLock Plus 3.3, \$84.95

FastLock Plus offers a twist on the usual password-protection scheme, allowing you to require a password every time you start up your computer or permitting you to use the package's FastLock 2.0 program to password-protect your hard disk whenever you choose. FastLock Plus includes protection from floppy disk bootups, and lets you override individual passwords with an authorized "master" password. Compatible with Windows 3.x.

Rupp Technology Corp., 3228 E. Indian School Road, Phoenix, AZ 85018; 800-852-7877 or 602-224-9922.

Integrity Toolkit, \$149

This antivirus and security package controls access, performs program audits, locks hard disks, and scans for virus infections.

Management Analytics, P.O. Box 1480, Hudson, OH 44236; 216-655-9770.

Iricrypt 4.01, \$125

Iricrypt uses memory-resident data encryption to prevent unauthorized access to your corporate or personal data. Automatically encrypts any file that is read from disk while compressing it to about half its original size. Optional password protection provides an additional level of security.

Techmar Computer Products Inc. (see listing for ComLock, above).

KeyLock 1.1, \$24

Locks your PC keyboard and encrypts the display, making it unreadable. You must enter a password to allow further use.

Management Analytics (see listing for Integrity Toolkit, above).

Lock-It, \$130

Lock-It prevents unauthorized copying of command, executable, and batch files from your hard disk while allowing full use of your programs.

Imagine That, 1 Evergreen Dr., Seaville, NJ 08230, 609-390-2799.

Menu Works Total Security 2.0, \$149.95

This PC security system includes Menu Works Advanced (see the entry under "Multipurpose Programs"). In addition to boot protection, it offers custom menus that restrict access to hardware and require you to log in and provide a password. Also provides a password-protected screen blanker, execute-only file protection, directory protection, and data encryption. Utilizes DOS command filtering and restricts access to the DOS shell to prevent users from bypassing the program's security features. (Site-license pricing available, starting at 50 percent off.)

PC Dynamics Inc., 31332 Via Colinas, Suite 102, Westlake Village, CA 91362; 800-888-1741 or 818-889-1741.

Microlok 2.5, \$69.95

Microlok offers a single level of security on stand-alone PCs and LANs. The program permits as many as 16 user IDs, each with a password. Prevents access to the hard drive when a system is booted from a floppy disk. Blanks the screen and locks up the keyboard after the system is inactive for a certain period. Or you may clear the screen and lock the keyboard by pressing a hot-key sequence. Password protection provides all-or-none access to system resources.

Kinetic Corp. (see listing for Access II, above).

Online Auditing Using Microcomputers 1.1, \$27.95

This collection of 28 public domain programs with custom documentation helps you review the security of a microcomputer installation. Programs analyze files, manipulate files, search for information, and compare, copy, display, and print documentation. Scans disks to locate viruses and determine the system's file structure, its hardware configuration, and the presence of hidden files. In addition to scanning for information, these utilities print directory trees and other documentation you can use as a permanent part of each PC's "work papers."

Jerry FitzGerald & Associates, 506 Barkentine Lane, Redwood City, CA 94065; 415-591-5676.

PCCrypto, \$59 (two-disk set) plus \$2 shipping

Implementing a "one-time pad" algorithm, PCCrypto allows you to encrypt your file off line, then send it via E-mail, modem, network, or courier to another party. The recipient also needs a copy of the program to decrypt the file off line; PCCrypto is sold in sets of two identical disks with manuals. This program is menu driven and features on-line context-sensitive help. (Windows compatible.)

DataSafe Computing, P.O. Box 22508, Alexandria, VA 22304; mail inquiries only.

PC/DACS 3.01, \$189

An access-control and security package suitable for establishing multiple levels of security on individual PCs or across a LAN. The Site Administration Tools module lets you transfer a company's security policies, standards, and requirements to each secured node, for a consistent security environment. The program conducts user-ID and password authentication during bootup and prohibits users from booting from a floppy disk to gain access to a hard drive. Lets you set up password protection for specified files or subdirectories. Includes virus protection, audit-trail reporting, automated installation, and a modular design that facilitates customized installation. The Deploy facility lets you build a system configuration, then broadcast the configuration to users across a LAN.

Mergent International (formerly Pyramid Development Corp.), 70 Inwood Road, Rocky Hill, CT 06067; 800-688-3227 or 203-257-4223.

PC Padlock, \$49.99

PC Padlock offers both password protection and file encryption. Designed for notebook computers; requires a password at bootup and lets you encrypt sensitive data files to limit access. Lets you customize each feature and install them individually.

CMG Computer Products Inc. (see listing for Authorized Personnel Only, above).

Personal Computer Registry, \$39

A system for positive computer identification, PCR software embeds a unique, encrypted serial number into

your machine's hard disk. This ID is listed with the International Personal Computer Registry, a data bank used by law-enforcement personnel to recognize and return stolen equipment.

Information Security Services Inc. (see listing for ACCESS Guard, above).

Privacy 3.1b, \$39.95

A memory-resident security utility for stand-alone PCs and LAN nodes, Privacy springs to life when you activate it from DOS or within an application. Blanks the computer screen automatically after a preset interval of inactivity, or you may lock the keyboard and blank the screen by pressing a hot key. A password is required to reactivate the computer. Lets you display your own moving message while the screen is blanked out. (Network version, \$99.95.)

Gateway Technologies, 180 W. Church Road, King of Prussia, PA 19406; 215-354-0330.

S.A.F.E. (Secure Access Facility for the Enterprise), \$295

An access-control, security, and encryption program for PCs and networks, S.A.F.E. supports as many as 255 secondary users per configuration and as many as 32 users per PC, and includes an audit-trail function. Users log on with a single password; the program prevents users from breaking out of the boot sequence or booting from a floppy disk. S.A.F.E. offers several levels of discretionary file access, from full access through read only to no access at all. It can also protect your critical system files from modification or deletion. Blanks the screen after a specified period of inactivity; locks the system after a specified number of incorrect log-on procedures. S.A.F.E. uses DES file encryption and provides immediate, on-the-fly decryption. (Supports the mouse. Network and Windows compatible.)

Fifth Generation Systems/Symantec Corp. (see listing for DiskLock, above).

Safekey, \$399 plus \$26 shipping

Safekey is a series of programs, compatible with major PC packages (including AutoCAD and 3D Studio), that override hardware locks. Sold to licensed users only. (Add 3 percent for credit-card orders. Quantity discounts available.)

Imagine That (see listing for Lock-It, above).

SafeWord PC-Safe II, \$175

SafeWord PC-Safe III, \$225

SafeWord Single Sign-On, \$50

SafeWord PC-Safe II, an automated encryption and security utility, protects an entire hard disk and locks up the keyboard. Requests passwords and sign-on cipher phrases, then encrypts and decrypts data automatically as needed. Maintains dynamic lists of authorized users, creates audit trails of all attempts to access the PC, and offers DES, ELI, ELI Turbo, or DES Turbo encryption.

SafeWord PC-Safe III offers automatic encryption of user-specified files and directories. Maintains dynamic lists of authorized users, creates audit trails of all attempts to access the PC, and also offers DES, ELI, ELI Turbo, or DES Turbo encryption. Runs as a memory-

resident program or as a device driver. Supports as many as 32 users per PC and as many as 32 groups.

With SafeWord Single Sign-On, an automatic password and log-on utility, you go through your password and sign-on procedure only once; the program signs onto subsequent systems for you automatically. Encrypts passwords and tokens with the DES algorithm. Compatible with all character-based applications that use MS-DOS-compatible BIOS functions for keyboard and screen I/O.

Enigma Logic Inc., 2151 Salvio St., Suite 301, Concord, CA 94520; 800-333-4416 or 510-827-5707.

SecretDisk II 1.06, \$125

The SecretDisk II data-encryption and password utility creates hidden logical disks, encrypting all program and data files within those disks. Lets you turn password-protected access on or off. Offers either DES or Lattice FAST encryption methods. Lets you build secret disks within other secret disks for added security. Can back up encrypted files in encrypted or unencrypted format, and lets you change passwords and encryption methods at any time. Supports floppy disks, hard disks, and removable devices such as the Iomega Bernoulli Box. (International version, \$175.)

Lattice Inc. (subsidiary of SAS Institute Inc.), 3010 Woodcreek Dr., Suite A, Downers Grove, IL 60515; 800-444-4309 or 708-769-4060.

SecurePC-Plus 6.0, \$199.95

A file-level security, encryption, and antivirus utility for PCs, this package protects data files and critical system files—such as COMMAND.COM, IO.SYS, MSDOS.SYS, CONFIG.SYS, and AUTOEXEC.BAT—from unauthorized access, virus attack, or erasure. Recovers system configuration information automatically, even after system files and the root directory are erased. Uses DES encryption on specified files automatically and offers a screen blanker for additional privacy and security. A directory-tree display lets you see a disk's structure; network menus provide easy access to shared facilities.

Hughes Data Systems Inc., 4522 S.W. Water Ave., Suite 100, Portland, OR 97201; 503-243-1029.

SecureZMODEM, \$99.95

This ZMODEM transfer protocol offers DES encryption and lets you negotiate digital encryption keys automatically without user intervention. Encrypts and decrypts transferred files so that neither party is aware of the process. Compatible with most popular communications packages.

Information Security Corp. (see listing for Digital Signature Algorithm, above).

securPERFECT, \$10

An invisible password system that prevents unauthorized access to partition areas of a hard disk, securPERFECT lets you scramble the root directory at shutdown; a password is required to unscramble it. Users can't bypass the system by booting from a floppy disk and logging onto the hard drive.

Multix Inc., 4203 Beltway Dr., Suite 7, Dallas, TX 75244; 214-239-4989.

SpyProof, \$149.95

A DES file-encryption utility that lets you protect any database, spreadsheet, word processing document, or other data file. Safeguards any DOS file stored on a hard disk, floppy disk, or network server. Lets you create encrypted files using macros, scripts, and keyboard templates, which makes the program easy for novices to use. Comes with templates for popular applications, such as WordPerfect, Crosstalk, and Paradox.

Information Security Corp. (see listing for Digital Signature Algorithm, above).

StopCopy Starter Kit 1.24, \$250

This protection software for developers or corporate users defeats all known copying schemes, preventing unauthorized users from duplicating disks and applications. (License for an unlimited number of users, \$595.)

BBI Computer Systems Inc., 14105 Heritage Lane, Silver Spring, MD 20906; 800-879-2224 or 301-871-1094.

StopLight ELS, \$99

StopLight ELS offers access control in the form of a required password upon bootup and keyboard lockup following a period of inactivity (also available by hot key). Protected programs continue to run under keyboard lock, but unlocking the system requires the correct password. An audit-trail module lists all file accesses and attempted security violations. A PC Checkup utility provides detailed hardware and software information; a hard disk recovery option repairs damage caused by boot-track viruses and disk corruption. For network use, a system administrator may assign security settings. (VirusNet/Pro optional; see entry in the "Antivirus Programs" section. Windows compatible.)

Safetynet Inc., 55 Bleeker St., Millburn, NJ 07041; 800-851-0188 or 201-467-1024.

StopView 1.02, \$250

This file-encryption utility prevents unauthorized users from viewing EXE or COM files. Useful for protecting programs you have written yourself. Includes Hacker Inhibitory Code (HIC) to thwart tracing.

BBI Computer Systems Inc. (see listing for StopCopy Starter Kit, above).

Super Crypt 3.12c, \$59

A menu-driven file-encryption tool that uses the DES algorithm to encodes files. Knowledge of the private key is required for decryption. Because it's compatible with many popular compression and archiving programs, you can create encrypted files that take up less space than the original files.

EZX Publishing, 917 Oakgrove Dr., Suite 101, Houston, TX 77058; 800-800-2468 (orders) or 713-280-9900.

Watchdog 7.0, \$295

This comprehensive security system prevents unauthorized access to PCs and their resources. Includes access control (via a user ID and password), data protection,

and system-level permissions. Offers additional security through automatic and transparent data encryption (DES algorithm) within protected directories. A full-featured menuing system lists options available to each user. Modifies the last user's memory work space so that subsequent users cannot recover any private data remaining there. (Watchdog for Windows Personal Edition, \$99.95.)

Fischer International Systems Corp., 4073 Mercantile Ave., Naples, FL 33942; 800-237-4510 (outside Fla.), 800-331-2866 (within Fla.), or 813-643-1500.

TASK SWAPPERS AND MULTITASKING ENVIRONMENTS

Where do you turn if you're a DOS user at heart but you want the flexibility and features of Windows—without Windows? Whether your needs are basic or sophisticated, you can probably find what you need in one of the DOS-based multitasking and task-swapping utilities profiled here.

A *task swapper* is similar to the shell that has been part of DOS since version 5. SoftLogic Solutions' Software Carousel is one example; it lets you switch among multiple applications without closing the current one. You can't conduct simultaneous tasks; rather, you launch multiple applications, then access them sequentially, suspending the current program before switching to another. Because you don't shut down an inactive program, you can pick up where you left off when you reactivate it. Many task swappers also offer some form of directory management, a menuing system, and other utilities.

Multitasking environments are different. When you switch out of a running program, it continues to process data—sorting a database, printing a report, downloading a file—while you work in another program.

Two of the best-known multitasking products are SoftLogic Solutions' DoubleDOS and Quarterdeck Office Systems' DESQView. DoubleDOS creates one background and one foreground partition, even on non-386 machines. With DoubleDOS at the helm, you can run one program in the background and another in the foreground.

DESQView takes multitasking a step further by letting you launch and run multiple applications simultaneously. DESQView also gives you a user-friendly shell from which to access applications and DOS facilities.

VM/386 from IGC falls somewhere in between these two applications, providing true multitasking with fewer of DESQView's additional bells and whistles. At the high end of the scale in this

product class is Quarterdeck's DESQView /x, a multitasking utility that brings the features of the X Windows system to the PC desktop. With DESQView /x, you can launch applications from other X Windows workstations on a network and view them on your local DESQView /x PC.

DESQView 2.6, \$149.95 DESQView /x 2.0, \$275

The DESQView multitasker establishes multiple windows in which you can run different DOS applications simultaneously. The program uses a mouse to select applications, branch directly to DOS and its commands, move and copy files, create and remove directories, and conduct other disk-configuration and -maintenance functions. It uses your computer's modem to autodial telephone numbers displayed on screen and builds macros with the DESQView Learn facility. Programmers may use DESQView's Applications Program Interface (API) to create workstation applications that work together. Includes the QEMM memory manager and Manifest, a memory-analysis and reporting tool (see entries under "Memory Managers").

DESQView /x supports the graphical standard X Windows and gives you access to applications installed on other X Windows workstations in your network.

Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405; 800-354-3222 or 310-392-9851.

DoubleDOS 5.51, \$69.95

Unlike DESQView, this multitasking utility establishes one background DOS partition in which you can run programs while another program is running in the foreground. Both partitions retain the conventional DOS interface. Supports EGA and later display adapters and software that writes directly to the screen.

SoftLogic Solutions Inc., 1 Perimeter Road, Manchester, NH 03103; 800-272-9900 or 603-627-9900.

Software Carousel 6.0, \$89.95

As a task swapper, Software CarouselTask lets you use all your favorite applications at the same time, switching among them at will. It eliminates the need to exit and reload each application when you want to use it. In addition, it lets you print in the background, cut and paste between programs, and pop up message windows, help screens, and more.

SoftLogic Solutions Inc. (see listing immediately above).

System Commander, \$99.95 plus \$6 shipping

For users who want to test multiple operating systems without disk partitioning, System Commander offers a way to keep as many as 16 versions of DOS plus 26 other Intel-compatible systems on the same machine. The program displays a menu of choices when you boot up; select the operating system you want, then reboot and make another selection when you're ready to try a different one. Not memory-resident; uses no conventional memory.

V Communications Inc., 4320 Stevens Creek Blvd., Suite 275, San Jose, CA 95129; 800-648-8266, 408-296-4224.

VM/386 3.0, \$295

A multitasking program for 386-, 486-, and 586-based PCs, VM/386 takes advantage of a processor's virtual 8086 mode to run more than one application at a time. It sets up multiple virtual machines (DOS sessions) that run concurrently, each operating as if it had the full resources of the computer. Offers true multitasking by running a different application on each of the virtual machines, which lets you run networks, large applications, and memory-resident programs that can't operate in real mode simultaneously.

Newest version is 20 percent faster than version 2.2 and offers multitasking on all workstations. (Windows compatible on all workstations. Network version for three users, \$395; five users, \$695; nine users, \$895; 32 users, \$1,049.)

IGC, 1754 Technology Dr., #108, San Jose, CA 95110; 408-441-0366.

MISCELLANEOUS UTILITIES

Some programs refuse to be pigeonholed, but that doesn't make them any less useful. In scanning the wide assortment of DOS utilities on the market, we uncovered a dozen programs in a class of their own. These one-of-a-kind offerings range from a universal spelling checker to a disk-sector viewer/editor to a math-coprocessor emulator, plus a few other handy items in between.

Battery Master 1.6, \$29

This memory-resident battery monitor for portable computers provides a battery gauge that pops up from within application programs so that you can see how much "juice" remains. An audible warning sounds when power falls below an acceptable level. The program maintains a history of your computer's battery performance to learn the characteristics of your particular PC. Also includes a Total Discharge program to allow a full discharge and complete recharge. (Network version for an unlimited number of users, \$695.)

Decisis Inc., P.O. Box 120481, Peoria, IL 61614; 309-655-0177.

Battery Watch Pro 4.0, \$49.95

Intended for use on battery-powered portable computers, Battery Watch Pro monitors computer use to estimate the time remaining in each battery charge. A fuel-gauge-type display pops up after you press a key combination or at a predetermined time near the end of the charge cycle, during which an alarm sounds. Countdown Mode continuously displays time remaining in the upper-right corner of the screen. Works with most major-brand laptops. (Generic version lets you enter manufacturer's claimed battery life for unlisted models. Runs under both DOS and Windows.)

Phoenix Technologies, 846 University Ave., Norwood, MA 02062; 617-551-4000.

Bridge-It 3.5, \$59

For users seeking to add a 3.5-inch disk drive to their older PC, XT, and AT systems, Bridge-It offers BIOS support for 720K and 1.44MB drives.

Microbridge Computers International Inc., 655 Skyway, Suite 122, San Carlos, CA 94070; 800-523-8777 or 415-593-8777.

db*Quick 1.0, \$99

db*Quick is a memory-resident pop-up utility that lets you access dBase and other databases from within other applications. Pop-up query screen instantly searches data stored in dBase or Alpha Four format, working within other applications. Uses the master file or index to search for database information and pastes the material it finds into other applications, including spreadsheets. Automatically dials telephone numbers found in the database search.

Alpha Software Corp., 168 Middlesex Turnpike, Burlington, MA 01803; 800-451-1018 or 617-229-2924.

db*Spell 1.0, \$99

This universal spelling checker works within specified files or directories. Handles a variety of formats, including Alpha Four, FoxPro, Paradox, dBase-compatible databases, Lotus 1-2-3, Microsoft Excel, and ASCII text files. Includes a dictionary of key words for supported applications so that commands and the like are not flagged as misspelled words. You can tell the program to check only strings within quotes and to add unrecognized words to your own personal dictionary.

Alpha Software Corp. (see listing immediately above).

Diff*it 2.06, \$129.95

A comparison tool that spots differences between samples of any kind of text or binary file, including reports, data files, BIOS versions, graphics images, EXE files, and source code. Works from the command line or a menu. Lets you compare text line by line or by word or byte. Provides a hexadecimal display.

Double R Software Inc., RD1 Fifth Ave., Valley Forge Manor, Phoenixville, PA 19460; 215-666-6104.

Keyworks 3.0, \$99

This universal keyboard enhancer and macro utility reduces long key sequences to a single keystroke, letting you custom-program your keyboard. You can use this memory-resident utility to access DOS commands, such as FORMAT, COPY, and DELETE, from within other applications. Lets you create your own pull-down, moving bar menus to help make any program easier to use. (Advanced version, \$199.)

Alpha Software Corp. (see listing for db*Quick, above).

LabelPro Laser for DOS 1.66, \$99.95

This utility can print an astounding variety of professional-looking labels on a desktop laser printer: mailing labels, address labels, audio and audiotape labels,

shipping labels, floppy disk labels, file-folder labels, card labels (rotary, postcards, index cards, name tags with holders), name-badge labels, and more. Also prints postal bar codes, code 39 bar codes, and four scalable fonts: Quincy, Calico, Times, and Arial. Supports mail merge from many popular word processing and database programs.

Avery Dennison, 20955 Pathfinder Road, Diamond Bar, CA 91765; 800-862-8369 or 909-869-7711.

The Norton Editor 2.0, \$99

This text processor is geared for DOS users working with AUTOEXEC.BAT or CONFIG.SYS, for programmers (particularly C and Pascal), and for anyone who needs to create or modify letters and memos in ASCII format. Features include a matching-bracket command, which helps you spot errors in nested punctuation; outline display, which lists only lines beginning with a letter or number in the first column, to speed up your search for a particular module or label; and automatic indentation, which moves the cursor on a new line to the same tab setting as the previous line. A split-screen mode lets you work on two program or text files simultaneously. Text layout options include word wrap, centering, margins, and tabs. (Network compatible.)

Symantec Corp., 2500 Broadway, Santa Monica, CA 90404; 800-441-7234 or 408-253-9600.

PC Pager, \$29.95

A memory-resident computing monitor, PC Pager tracks lengthy operations, such as tape backups, database reports, billing, or sorting. When the current task is finished, the software notifies you by beeping the computer's internal speaker or by dialing a phone number.

Advantage Software, 3713 Garrett Road, Drexel Hill, PA 19026; 215-626-5914.

PCResume, \$49 plus \$6 shipping

A desktop saver, PCResume saves your computing environment to the hard disk whenever you press a hot-key sequence or the software senses a power outage. Then turn off your system; when you turn it back on, PCResume restores your desktop at the point at which you left it. (Windows compatible. Also available as a plug-in board with battery backup, Powercard IPS, \$299 plus \$15 shipping, and as a power strip, PCResume/GMC, price to be determined.)

Powercard Supply, 804 Cherry Hill Dr., Staunton, VA 24401, 800-637-2797 (orders) or 703-886-0408.

Personal Computer Recorder 1.1, \$65

Records and plays back user sessions. Audits work, performs remote diagnostics and repairs, recovers from crashes, and performs standardized product and system testing.

Management Analytics, P.O. Box 1480, Hudson, OH 44236; 216-655-9770.

QEdit Advanced 3.0, \$59 plus \$5 shipping

A customizable text editor capable of handling both program code and text files, QEdit Advanced consists of

a single, 45K EXE file. Among its word processing features are word wrap, cut-and-paste capability, block operations, and the ability to recover deleted text. Programming support includes the ability to run compilers without exiting and automatic indentation. The menu-based program also lets you "shell out" to DOS and reprogram the keyboard. (A memory-resident version, QEdit TSR, sells for \$99.)

Semware, 4343 Shallowford Road, Suite C3A, Marietta, GA 30062; 404-641-9002.

Resident Expert for DOS, \$49

This on-line manual for DOS commands and operations includes a hypertext-based index and searching scheme.

Includes information about all versions of MS-DOS.

Parsons Technology, P.O. Box 100, Hiawatha, IA 52233; 800-223-6925 or 319-395-9626.

Soft 87, \$39

Known formerly Multix Mathchip Emulator, this pair of memory-resident utilities for DOS emulate a math coprocessor by performing floating-point calculations usually handled by a math chip. They work with most DOS-based programs that do not run in protected mode. (Version for 80287, \$39; version for 80387 and later, \$49.)

Multix Inc., 4203 Beltway Dr., Suite 7, Dallas, TX 75244; 214-239-4989.

INDEX TO VENDORS

AApex Software	71	Helix Software Co. Inc.	68	PC-Kwik Corp.	57, 69
Abacus Software Inc.	57, 61	Horizon Technology Inc.	67	PCX Corp.	52
Abelson Communications Inc.	59	Hughes Data Systems Inc.	75	Pegasus Imaging Corp.	66
Acculogic	68	Hyperkinetix Inc.	59	Personally Developed	
Adlersparre & Associates	62, 65, 68	IGC	76	Software Inc.	61, 63, 65, 67, 69
Advanced Computer Innovations	65	Imagine That	74	Personics Corp.	72
Advantage Software	77	Information Security Corp.	73, 75	Phoenix Technologies	76
Ai Squared	72	Information Security		PKWARE Inc.	61, 63
The Aldridge Co.	56, 61, 62	Services Inc.	50, 72, 73, 74	Polyhedron Software Ltd.	65, 67
AllMicro	53, 56	Inner Media Inc.	66	Power Up Software Corp.	63
Alpha Software Corp.	76	Inset Systems Inc.	66	Powercard Supply	77
American Megatrends Inc.	54	Inside Technologies Inc.	60	Progressive Computer Services Inc.	60
Application Techniques Inc.	66	Instant Replay Corp.	71	Qualitas Inc.	55, 67
Armasi Inc.	66	Integrated Custom Software Inc.	60	Quarterdeck Office Systems	68, 76
AT&T Secure Comm. Systems	73	Integrated Information		Radix2 Software Engineering	59, 73
Automation Technologies	60	Technology (IIT)	63	RenaSource Group Inc.	54, 55
Avery Dennison	77	Intellogic Trace Inc.	54, 55	Revolution Software Inc.	71
Backus-Naur Inc.	59	International Microcomputer		RG Software Systems Inc.	51
BBI Computer Systems Inc.	75	Software Inc. (IMSI)	51	Rupp Technology Corp.	65, 74
Berkeley Systems Inc.	71	International Security		RYBS Electronics Inc.	68
Biologic Co.	52, 65, 68, 71	Technology Inc.	51	Safetynet Inc.	50, 51, 60, 75
Black Oak Computer Services Inc.	61	Interplay Productions Inc.	51	Samkha Software Corp.	64
Blue Rithm Software	67	Jerry FitzGerald & Associates	74	Semware	77
Blueberry Software	64	JIP Software Inc.	58	SkiSoft Publishing Corp.	71
Brown Bag Software Inc.	69	Kinetic Corp.	59, 72, 74	SoftLogic Solutions Inc.	58, 63, 68, 76
Buerg Software	59	Landmark Research		Software Directions	70
Central Point Software	49, 52, 62, 69	International Corp.	54, 55, 56	Software Matters Inc.	
Clone Star Software	53	LaserGo Inc.	70		53, 57, 58, 62, 66, 70, 72
CMG Computer Products Inc.	73, 74	LaserTools Corp.	70	Sonera Technologies	54
Command Software Systems	50	Lassen Software Inc.	61	Spirit of Performance Inc.	55
The Complete Machine	61	Lattice Inc.	75	SPSS Inc.	64
Computer Associates		LEAD Technologies Inc.	66	Stac Electronics	53, 57
International Inc.	73	Lone Star Software/		Sterling Software	53
Computer Tyme	60	Cactus International	52, 65	Symantec Corp.	
Conner Peripherals	52	Maggee Enterprises Inc.	59, 62		50, 52, 57, 60, 61, 69, 73, 74, 77
CyberMedia	55	Management Analytics	74, 77	System Enhancement	
DAC Micro Systems	60	Mastersoft Inc.	65	Associates Inc.	62, 69
Dariana Software	54, 55	MBS Technologies Inc.	63	Systems Compatibility Corp.	64, 65
DataSafe Computing	74	McAfee Associates	49, 51, 67	Sytron Corp.	53
DataViz Inc.	64	McDriven Software	60	Tally Systems Corp.	55
Datawatch Corp.	51	MCS Group Inc.	64	Tapedisk Corp.	53
The Davidson Group	50	Mergent International	74	Techmar Computer Products Inc.	
Decisis Inc.	62, 76	Merlin Software Development Co.	58		49, 51, 73, 74
DiagSoft Inc.	55	Micro 2000 Inc.	54	TeraTech Inc.	57
Digital Dispatch Inc.	49	Micro House International	58	Thompson Network Software	50
Discoversoft Inc.	70	Micro System Designs Inc.	63	Titus Communications Corp.	61
Disk Technician Corp.	54	Microbridge Computers		Tools & Techniques Inc.	61
Dolphin Software	73	International Inc.	59, 76	Touchstone Software Corp.	54
Double R Software Inc.	76	Microsystems Software Inc.	72	Trackmate America Corp.	56
ElioShim Microcomputers	51, 53	MJM Software Design	60	Traveling Software Inc.	65
Enigma Logic Inc.	50, 75	Multix Inc.	75, 77	Trend Micro Devices Inc.	50
EZX Publishing	61, 75	MySoftware Co.	52	Unitrol Data Protection Systems Inc.	53
Fairware	59	Natural Language Solutions	59	V Communications Inc.	68, 73
FastTrax International	58	Neosoft Corp.	61, 71	Verisoft Systems Inc.	51, 57
Fifth Generation Systems/		NoVaSoft	60	WaterGate Software Inc.	55
Symantec Corp.	52, 60, 73, 74	OnTrack Computer		White Crane Systems Inc.	64
Fischer International Systems Corp.	75	Systems Inc.	50, 54, 58	WindowDOS Associates	56, 62
Gateway Technologies	74	Pacific Micro Electronics Co.	64	The Wizardworks Group	51, 63, 69, 71
Gazelle Systems Inc.	52, 58, 61, 69	Panda Systems	50	WordPerfect Corp.	64
Genus Software Corp.	60	Parsons Technology	51, 77	World Software Corp.	67
Gibson Research	58	PC Dynamics Inc.	61, 69, 74	Wyndware	62
Handmade Software Inc.	64	PC Guardian	73	ZylLAB	67

(Continued from page 96)

also is handy for checking your BIOS setup values to be sure they match the drive you have installed.

The only documentation is two help screens of terse information. But MH-IDE is really a teaser for Micro House's commercial program, DrivePro, which is used by computer support and repair professionals. The program's last screen is an advertisement for DrivePro and lists the features of the full program.

MH-IDE can be useful if you are technically knowledgeable or if you lose your CMOS battery and haven't made a copy of the drive parameters from the Setup screen. If you fit that definition, this is a "great" program.

Help for Pack Rats

Unless your computer is brand new, you undoubtedly have a lot of unused and useless files sitting on your hard disk. But do you know which files Windows, or other applications, really need? Every major application seems to load a gazillion files onto your hard disk, but it may use only a few.

Peter Royle of Laval, Quebec, Canada, found a program that provides answers to such questions:

Deadwood is just the ticket for all of us who have limited hard disk space, and who are constantly juggling our files around to make the most of the little bit we have. When we use a program, we are never sure which files are essential and which are unnecessary. We are afraid to erase any in case they will be needed.

Deadwood tracks your file usage and shows you which files have been used and which have been left untouched. It helps you intelligently decide which files you can dispose of or store on floppies. The result can be megabytes of empty disk space.

I found Deadwood to be fairly easy to use. You simply run a batch file that loads two small memory-resident (terminate-and-stay-resident) programs, also called TSRs. Then you "exercise" your application: For example, load and unload fonts, try every program mode, run the spelling checker, and so on. When you are done, you return to the DOS prompt and run a second Deadwood batch file to unload the TSRs.

While you have been working with your application program, the Deadwood TSRs have been busy recording every disk access. Run the main Deadwood program, and you will see a list of every file in every directory on your hard disk. Some files will be marked as Unused. Files that have been used will be marked as Created, Executed, Opened for Read/Write, and so on.

However, if you run a virus checker or some other program that opens every file on your hard disk, the information will be useless. But if you think a bit, you can get a lot of useful information from Deadwood. The main screen not only displays access information about each file, it also lets you perform simple file maintenance. You can tag files, delete or move individual files or groups, and choose which files to view.

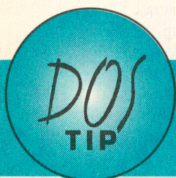
Still, you can't always be certain that you have exercised every capability of every application. For instance, are you sure that a program doesn't access a special file on alternate Tuesdays if you're working with a file that is between 100K and 122K in length and has a 4-character name? I suggest you use Deadwood to decide what files to move to floppy disk or tape storage.

Deadwood has a few silly limitations. For example, it can only work with filenames that are 50 characters or less in length, including the drive letter, colon, backslashes, and subdirectory names. Files with longer names are simply ignored by the TSRs, so they are always marked Unused. Also, the author strongly suggests that you don't run the TSRs with DOS's LOADHIGH command. Since they only use about 17K bytes together, that's really no problem.

If you want to get rid of all of those useless files on your hard disk, give Deadwood a try. It really might help with that hard disk cleanup you've been putting off—and wouldn't that be "great?"

A Better Path

Robert Casas of Glenview, Ill., found a quick solution to an old problem:



A MORE READABLE PATH

If your PATH statement is anything like mine, it's crammed so full of directories that you have trouble sorting out which directories are included. LISTPATH.BAT makes things perfectly clear, displaying each directory in the PATH on a separate line:

```
@ECHO OFF
ECHO.
ECHO The following directories are listed in the DOS path:
ECHO.
FOR %%V IN (%PATH%) DO ECHO      %V
ECHO.
```

After creating the batch file, simply type LISTPATH to see a highly readable list of the directories in your PATH.

—Doug Lowe

My PATH had grown so large that DOS was searching 45MB of data each time I typed a command. PATHA came to my rescue, along with a small group of batch files. PATHA lets you add, delete, insert, or edit items in the PATH on the fly and without rebooting. Only DOS and BATCH are in my PATH now, with other directories being added or deleted by PATHA and short batch files as necessary.

At first I wasn't impressed with PATHA. I've seen many utilities that let you edit the PATH statement interactively, and I was disappointed that PATHA required command-line options to work correctly. But my first impression was wrong. PATHA definitely goes in the "great" category. It does one thing very well indeed, and with a minimum of fuss.

To use PATHA, you type its name plus some text and an option or two. For example, if you want to remove the C:\WINDOWS directory from your PATH, type:

```
PATHA C:\Windows /d
```

The /d means "delete directory from my path."

PATHA can add directories to the front or back of your PATH, add or delete the current directory or any directories you name, increase the length of your PATH to 1,024 characters, and reset it from AUTOEXEC.BAT or from any other file you specify. It will even let you edit the PATH directly.

The direct editing feature is handy, but it isn't PATHA's strong point. The program really shines when you want to keep your PATH as short as possible and manipulate it with a series of batch files.

PRODUCT INFORMATION

Deadwood 1.00, \$29

Christopher B. Eckles
P.O. Box 225
Waleska, GA 30183
404-479-2888

IDE Identify 1.40, no registration fee

Micro House International
4900 Pearl E. Circle #101
Boulder, CO 80301
800-926-8299

PATHA 2.2, \$5

(add \$3 for disk and manual)
HGB Enterprises
P.O. Box 150706
Ft. Worth, TX 76108

PATHA is easier to use than the standard batch-file tricks of saving one path and building another one, and its ability to read a PATH setting directly from a file or your AUTOEXEC.BAT can be very valuable.

I like PATHA, and even though I already have an interactive PATH editor on my computer, I think this utility may stay around to help me keep my PATH setting under control. ■

Contributing Editor Hardin Brothers has been working with and writing about computers for 14 years. He also evaluates shareware programs for CompuServe's On-Line Today electronic magazine.

SHARE THE WEALTH

Shareware Exchange invites you to send a copy of your favorite shareware, along with a description of the program and an explanation of why you like it (500 words or less), to Shareware Editor, *DOS Resource Guide*, 80 Elm St., Peterborough, NH 03458. Be sure to tell us how we can obtain a copy of the program. We'll pay contributors \$50 for each program featured in this column. Please, don't send us shareware that you have written—we want recommendations from users, not from authors. You can contact us on CompuServe at 75300,2361 or on the *DOS Resource Guide* Bulletin Board System (BBS) at 603-924-3181.

All programs featured in "Shareware Exchange" are available electronically from the DRG BBS. There are no connect-time charges—you pay only for the phone call.

Set your communication program's parity settings at 8 data bits, no parity, 1 stop bit (8,N,1). Then dial 603-924-3181 and wait for the "Connect" message, which tells you that you've entered the BBS successfully. If you're a first-time user, the

system will ask you to verify the spelling of your name and to choose a password. Then it will display a general information screen, followed by a questionnaire containing 10 questions about your address, phone number, and so on. (You must answer the questionnaire to set up your user account and gain access to the BBS.)

From this point on, the on-screen prompts are the same for all users. Press C (Continue) at the next screen to access the main menu. From there, press the F key (for File Menu) and Enter, followed by L (List Available Files) and Enter. Then you'll see a list of file areas. Choose the number (2-5) that corresponds to the shareware category listed for each program in this article, and follow the downloading instructions on screen.

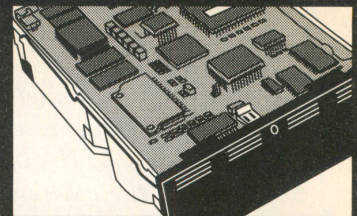
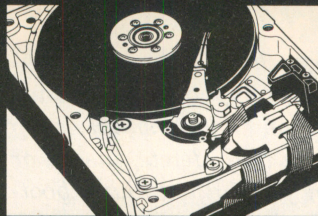
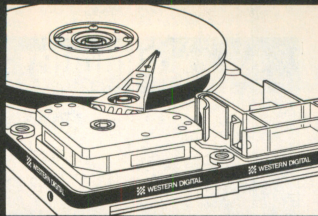
All three of this issue's programs are in the Shareware Utilities file area. The filename for Deadwood 1.00 is DEAD10-.ZIP; for IDE Identify, IDEID140.ZIP; and for PATHA, PATHA.ZIP.

—Eds.

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SCSI			
1060MB	9ms	CFP1060S	\$789

Maxtor

IDE			
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345MB	14ms	7345A	\$278
540MB	12ms	7546A	\$392

MICROPOLIS

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1740MB	10ms	MC2217A	\$969
SCSI			
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3020MB	11ms	MC1936	\$1999
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Seagate

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2145MB	8ms	ST12550N	\$1639
2148MB	9ms	ST12400N	\$1399

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341MB	12ms	AC2340	\$265
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540MB	11ms	AC2540	\$395
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270MB	12ms	LPS270A	\$229
342MB	12ms	LPS340A	\$269
541MB	12ms	LPS540A	\$425
SCSI			
170MB	14ms	LPS170S	\$199
270MB	12ms	LPS270S	\$229
342MB	12ms	LPS340S	\$289
541MB	12ms	LPS540S	\$449
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Teac	CD50	2X	265ms	\$259
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CDU561	\$429	\$459	\$469	\$519
XM3401	\$459	\$489	\$519	\$559
CDR510	\$509	\$539	\$579	\$609
CDR900	\$1119	\$1149	\$1159	\$1199

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XM3401	\$789	\$1659	\$2999
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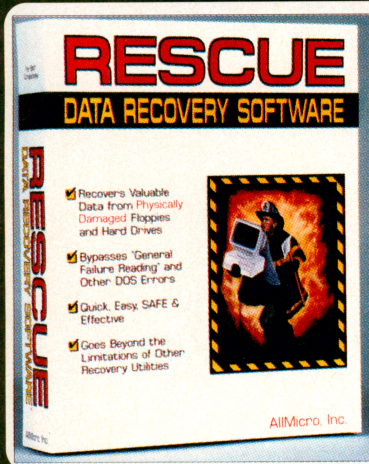
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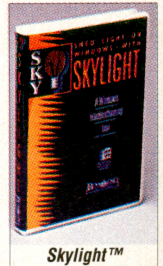
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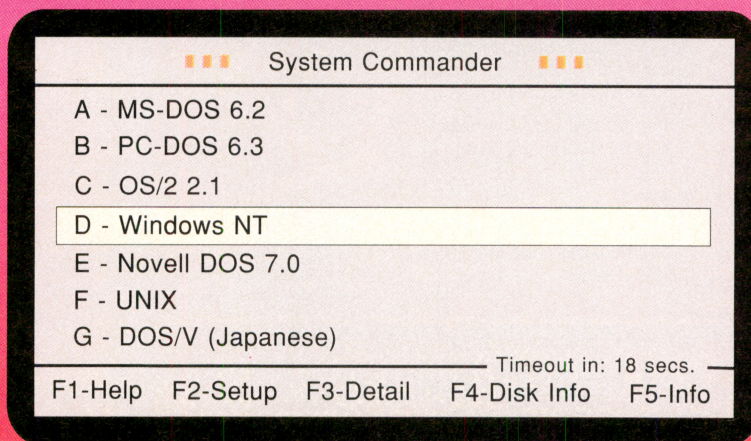
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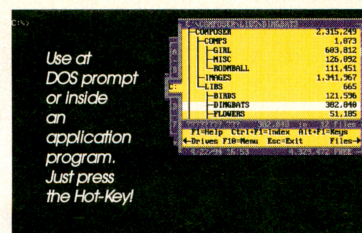
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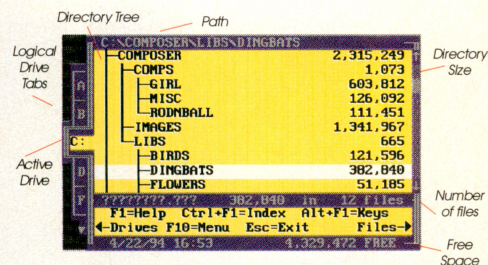
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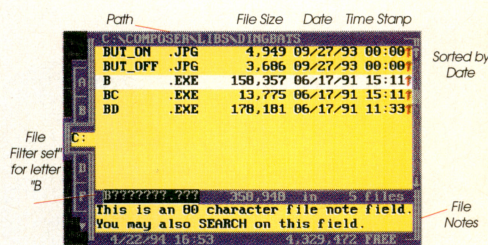
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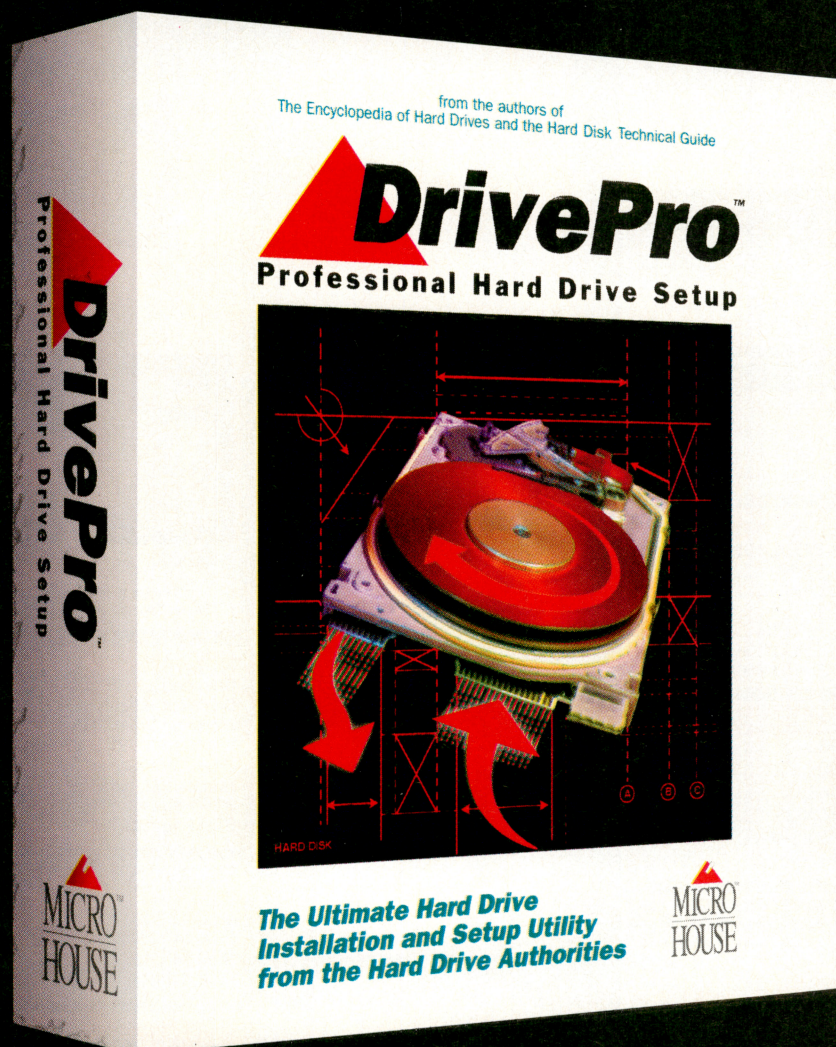
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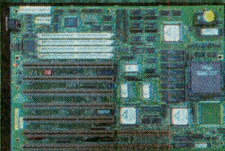
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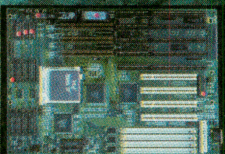
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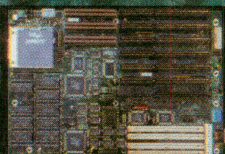
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106	119	132	145	158	171
107	120	133	146	159	172
108	121	134	147	160	173
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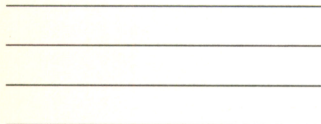
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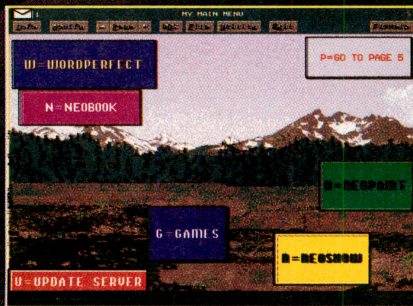
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When It's Worth Doing Well

9:00



Arrive at work. I turn on my computer to be greeted by the soothing graphical display of my customized **QuikMenu** screen (only \$35*). I notice that I have an E-Mail message. Its from the boss—he wants a catalog containing our newest product, and he needs it tomorrow!

To make a good impression, I decide on an electronic catalog. I use **NeoPaint** (just \$45*) to quickly edit the same images we normally use with our desktop publishing program to produce printed flyers. **NeoPaint** lets me get the results I want—without bringing my computer to a standstill or forcing me to think like a programmer.

9:05



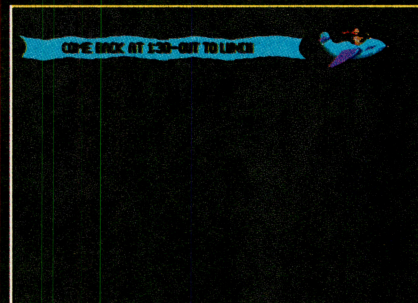
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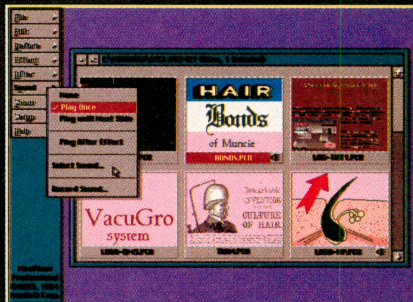
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12:00



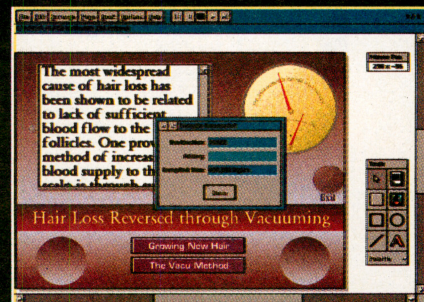
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4:00



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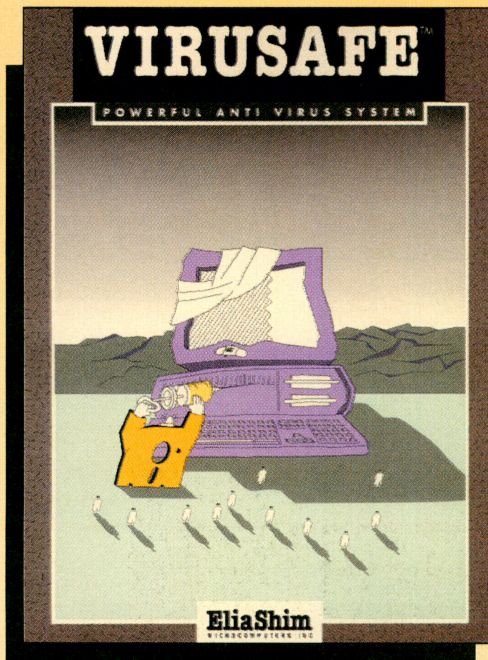
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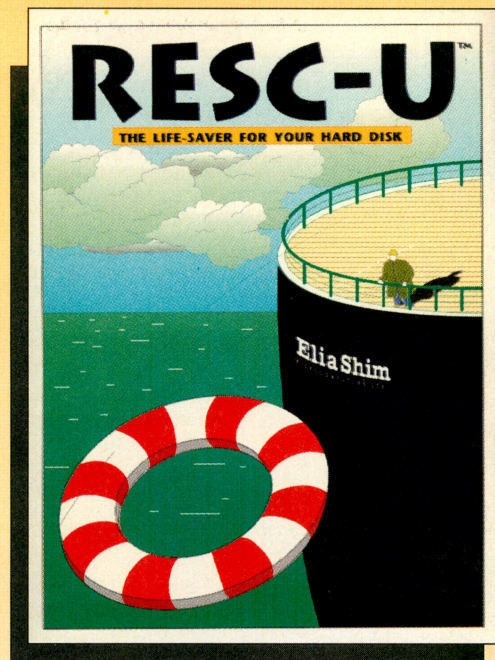
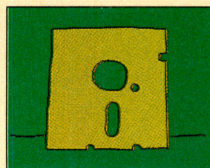
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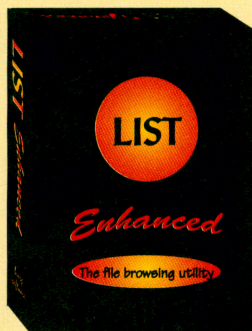
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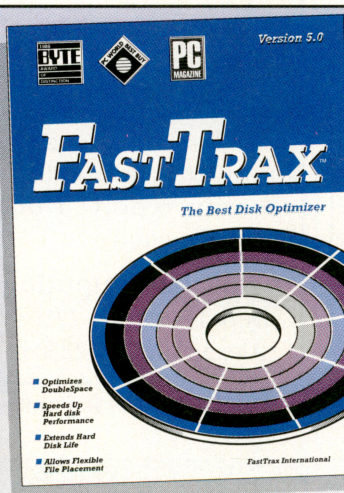
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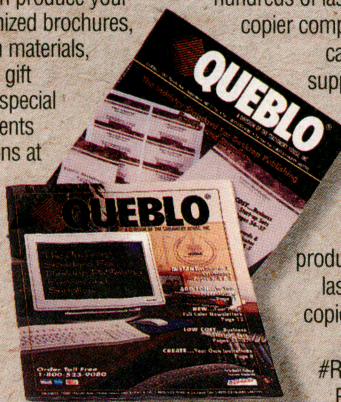
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by Hardin Brothers

I generally sort shareware and commercial utilities into three categories: "great," "ho-hum," and "yuck." The "great" programs are those that solve a problem or provide a new service elegantly and cleanly. You can run many of these with just a glance at the documentation because their designers made the program's purpose clear. These are the utility programs I enjoy and use. One good example of such a program is PKZIP and its companions (PKUNZIP, ZIP2EXE, and so on).

"Ho-hum" programs are those whose purpose is clear but that are not particularly useful. For example, do you need a program that displays a sorted directory? Before DOS 5 appeared, perhaps so. But in today's world, the hundreds of "improved" directory programs seem useless.

Finally, there are the "yuck" programs. Actually, this category can be divided into "yuck-a" and "yuck-b." "Yuck-a" programs are those that are unnecessarily difficult to use. Either they require an obscure set of commands or their screens and menus are not self-explanatory. If an application is difficult to use, you may become accustomed to it and actually enjoy it after a while—early versions of the WordStar word processor certainly were that way. But utilities generally aren't used as much as applications and shouldn't have a steep learning curve.

"Yuck-b" utilities are those whose designer forgot the original purpose of the program. The utility is buried in a drift of unrelated features, crowded screens, and cramped menus. Sometimes, the part of the program that addresses the original purpose is weaker than it should be because the developer concentrated on the auxiliary features.

Great or Ho-Hum?

We start off with a short utility program this month that I place in the "great" category because I find it really useful. If it isn't useful to you, you might be tempted to put it in the "ho-hum" group. However, the day may come when it just might spare you from a catastrophe. This utility was nominated by Sol Mark

Parrish of Tucson, Ariz.:

All programs fall into three broad categories: great, ho-hum, and yuck. Find out how three reader-submitted utilities fared.

MH-IDE is a free-ware utility from Micro House International. It helps greatly when someone loses the CMOS setup, because you don't

even have to open the CPU case to inspect the hard drive for information.

MH-IDE, or IDE Identify as it is formally called, is a simple program. Just run it, and it gives you all the information you need about an IDE hard drive: the model; the number of heads, cylinders, and tracks; the formatted capacity; the data transfer rate; and the controller type. Some of that information is for the curious only—after all, there's not much you can do about the data transfer rate except look at it.

But the numbers for heads, tracks, and cylinders can be invaluable. The program displays three sets of these numbers: the values reported by the drive, by the Basic Input/Output System (BIOS)—which includes the CMOS setup values—and by DOS's drive parameter table.

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(Continued on page 78)



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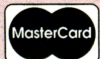
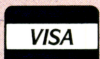
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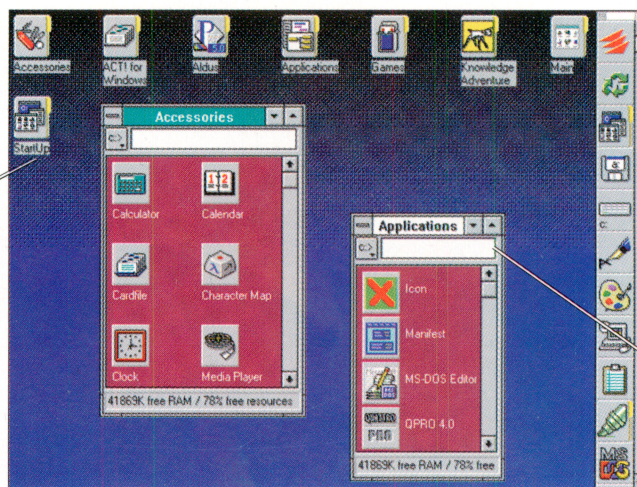
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